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BATTELLE MEMORIAL INSTITUTE

GOOD NEIGHBOR

FRANCIS W. BOULGER

A group of iron and steel experts are meeting in Bogota, Columbia, this month and next. They were called together by the Economic Commission for Latin America, an agency of the United Nations. Wise in the steel lore of the great steelmaking nations, their task is to suggest production, technical, and economic policies for the relatively new and growing steel industries of South America.

Battelle's Francis W. Boulger was one of those invited to participate in the conference. In his paper on "Some Effects of Minor Elements on the Characteristics of Plain Carbon Steels", he points out that steels containing more sulfur and phosphorus than those produced in the United States may be entirely satisfactory for many uses. This fact may be significant in the South American steel picture. Much of the immediate need is for tonnage steels that do not call for close specifications. Moreover, since the demand for finer industrial steels is still limited, the steel industry of South America should be able to adjust from broader to narrower standards as the need arises.

The study of the problems of South American steel producers is a new field for Fran. However, his career has been identified with steel since he entered college. A high-school vocational lecture on the difficulties of metallurgy helped to steer him into that field. If metallurgy was a tough subject, Fran wanted a crack at it. He found the subject to his liking and graduated from the University of Minnesota with a degree in metallurgical engineering.

In 1936, Fran was awarded a Battelle Fellowship and joined the Institute staff the next year, after receiving his Master's degree in metallurgy at The Ohio State University. Since that time he has worked on many aspects of steel production. These include deoxidation of steel, effects of gases on properties of steel, chemical properties of coke as they affect blast furnaces, and cold pressing and cold drawing of steels. His research on the machining of metals and the properties that affect machinability has been particularly significant. Recently he has been engaged in research on titanium and zirconium.

Fran is a member of the American Foundrymen's Society, the American Society for Metals, and the American Institute of Mining and Metallurgical Engineers. He is a member of the AIME Committee on Physical Chemistry of Steelmaking.

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Operations Diagnosis

With the increased use of technology, business operations have become extremely complicated. In large companies today, operations are so complex that it is no longer safe for management to make decisions based on individual judgment, even though this judgment results from broad and intensive experience in the company's affairs. For this reason, management in many industries is turning to techniques of scientific analysis to arrive at information necessary for making decisions.

Operations research is becoming increasingly popular as a form of analysis. Industry borrowed this method of solving problems from the military. It was developed during the last war to analyze the factors involved in a military operation, such as logistics, weapon effectiveness, costs, et cetera. It embraces the relating of complex variables affecting an operation in a mathematical manner to show cause and effect. It has proved remarkably effective both in military and industrial applications.

Engineering economics is another tool used by management to analyze company problems. Already widely used, it amounts to a science of prediction of technical-economic opportunities and risk. Although the techniques of higher mathematics are not used, engineering economics provide a quantitative analysis of markets, sources of raw materials, opportunities for diversification, industrial logistics and plant location, the competitive effects of technology, and research planning.

Operations research and engineering economics overlap to some extent. It is frequently difficult to tell where one leaves off and the other begins. Some consider operations research a branch of engineering economics. Others regard it as a separate and distinct technique of study. Actually, both are essential for complete and accurate diagnosis. Perhaps a new term is needed to embody what is implied by both terms, since they are both tools for analysis of industrial problems.

The combined use of operations research and engineering economics to solve management problems might well be called "industrial operations diagnosis". This concept has an obvious parallelism in medicine. A business organization may be compared to a biological organism. Both are organizations of intricately related parts, each with delicate function. In medicine, we diagnose what is wrong with the organism and then prescribe a remedy. With modern scientific tools, we can likewise diagnose the causes of the technical and economic symptoms in an industrial or commercial operation and prescribe a remedy. The comparable term in the military field would be "military operations diagnosis", and the inclusive term would be "operations diagnosis".

One of the advantages of taking such an approach to industrial problems is that the industry is regarded as a unit. The function of any part is considered only in respect to the whole. By diagnosing scientifically the causes of symptoms, remedial actions need not be based on hunches, pet ideas, or makeshift expedients, but rather on properly evaluated methods for removing the causes. Futile research on superficial indication is eliminated, and an efficient attack is formulated on the basic source of trouble. Problems of semantics in communication between members of management are reduced when the industrial diagnostic approach is assumed.

There can be no doubt but that the idea embodied in the term "industrial operations diagnosis" will have great influence on the future of American industry. It will make research more efficient and it will show sure roads to profitable investigation. It will inevitably bring about a greater demand for applied research.

Clyde Williams

Director, Battelle Memorial Institute

Post-Issuance Patent Problems

by WILLIAM J. MASE *and* JOHN L. GRAY *The authors, both of whom are admitted to practice before the U. S. Patent office, are members of the legal staff at Battelle. William Mase, formerly of the Institute research staff, received his electrical engineering degree from The Ohio State University in 1943 and later was awarded a law degree from Franklin University. John Gray is a chemical engineering graduate of Pratt Institute and a graduate of the Albany Law School, Union University. Both men are members of the Ohio Bar Association.*

AN APPLICANT for a patent can expect to spend about three years in getting his application through the Patent Office. Indeed, it is not unusual for the process to take longer than that. We would expect that the patentee, having taken so long to get his patent, had established his case. It would seem that he could reasonably expect that all questions as to the novelty, utility, originality, validity, etc. of his invention had been finally settled.

Unfortunately, this is not true. The issuance of Letters Patent is much like the awarding of an academic degree, in that both are really symbolic of a "commencement" and are not truly conclusive acts. Each is evidence of the overcoming of numerous difficulties in the past. Neither is a guarantee that similar difficulties will not be met in the future. For this reason, it is worth while to consider a few of the problems that may arise to harass holders of patents after a patent has issued.

It is not unusual for issued patents to contain significant errors. The errors may be the fault of the applicant or of the Patent Office. Whatever the source of the mistakes, it is essential to correct them so that inventions are adequately protected. Errors of a minor nature that do not change the meaning of a statement in a patent do not require correction. Misspelled words about which there could be no possible misunderstanding are examples of such minor errors.

If the mistake is the fault of the Patent Office, a Certificate of Correction should be requested from that office. However, if the applicant-patentee made the error, he can correct it by filing and prosecuting a reissue application, or in some cases by filing a disclaimer.

CERTIFICATE OF CORRECTION

Every patentee should read his Letters Patent carefully as soon as he receives it. He should note all typographical errors, erroneous insertions or omissions of words, misplaced decimal points, and other errors. If any errors are found that change the intended meaning of any portion of the patent and if the errors have been made by the Patent Office, steps should be taken. The patentee or his assignee should immediately return the original Letters Patent document, together with a paper pointing out the error and requesting that a Certificate of Correction, correcting the specific error, be attached to the original patent.

Under the provisions of Rule 322, the Commissioner of Patents or his representative will issue a certificate in the form of a slip calling attention to the error and attach a copy to original document and to each copy of the patent. No fee is required for such a certificate.

An example of a Certificate of Correction is given below. It was prepared for attachment to U. S. Patent 2,525,700.

Certificate of Correction

Patent No. 2,525,700 October 10, 1950

George K. Manning et al.

"It is hereby certified that error appears in the printed specification of the above numbered patent requiring corrections as follows:

Column 5, lines 67 to 69 inclusive, beginning with the syllable 'ous' strike out all to and including the word 'case' in line 69, and insert the same before 'tends' in line 57, same column;

and that the said Letters Patent should be read as corrected above, so that the same may conform to the record of the case in the Patent Office."

Signed and sealed this 16th day of January, A. D. 1951

SEAL

Assistant Commissioner of Patents
Thomas F. Murphy

Under the provisions of the Patent Codification Act, which becomes effective January 1, 1953, a patentee or assignee may obtain a Certificate of Correction for his own errors. This differs from the previously described

certificate in that the patentee must accompany his request for a correction with a fee of ten dollars.

Reissue Patents

Reissue patents are statutory devices for correcting errors that would render a patent either inoperative or invalid. They may be issued to correct defects in claims, specifications, or drawings. In applying for a reissue patent, the applicant must show that the error arose through "inadvertence, accident or mistake" and without any fraudulent intent. An application for a reissue corresponds in every respect to an original application for Letters Patent and is subject to examintion just as is any other application. However, no requirement for division of a reissue application will be made during the examination.

The phrase "invalid or inoperative" is not to be interpreted literally. In connection with reissued patents, it may be taken as meaning that the original patent fails to secure for the inventor the whole of his invention. A reissue will not be granted merely to expand original claims. It may be obtained only to gain what was the original and true invention of the patentee. The words "inadvertence, accident or mistake" clearly show that the purpose of the reissue patent is to correct bona fide accidental mistakes. Errors in judgment or deliberate acts of an applicant may not be overcome in this way. Moreover, the applicant may be held responsible for the actions and mistakes of his attorney.

The courts have passed on some of these points. Thus in the case of General Radio Company v. Allen B. Dumont Laboratories[1] the Court said: "Where patentee's solicitors drew functional claims relating to cathode-ray oscillograph with the intention of covering any and all means which might be devised in the future to solve the problem which patentee's particular means solved, the solicitor's action, if error, was no more than an error of judgment which was binding upon the patentee and could not be rectified by a reissue patent." Knowledge on the part of the applicant will also negative an allegation of inadvertency as was made clear in the case of Putnam v. Hutchinson[2]. In that decision the Court stated that "where a claim was presented and rejected and the applicant knew of the rejection, there was no inadvertence, accident, or mistake."

It is important that a patentee apply for a reissue patent as soon as he discovers an error or defect in his Letters Patent. This is particularly true if he wishes to broaden his claims. Although no time limit has been set by law, applications for reissue patents broadening claims should be filed within one year of the issuance of a patent. This is true because matter disclosed, but not claimed, is ordinarily considered as abandoned to the public one year after a patent is issued.

The courts usually require that the reissue application be filed within a "reasonable time", and it becomes the responsibility of the applicant to prove that he did not delay unreasonably before filling the reissue application. Thus, in Otis Elevator Company v. Atlantic Elevator Company, Inc.[3] it was said that "where application for reissue patent was delayed more than two years, special circumstances had to be shown to excuse delay where claims were broadened." In the cases where narrower claims are to be filed in the reissue application, no imputation of delay arises until the patentee discovers the inadvertence that is the occasion for the reissue.

Reissue patents expire on the same day as the original patent on which they are based would have expired. Reissue applications may be filed by the inventor or his legal representative (guardian, administrator, etc.) , or by the assignee, if the original patent has been assigned. Licensees and grantees need not join in the application for a reissue.

It sometimes happens that a reissue patentee obtains broadened claims that dominate a product of a third party, although the manufacture did not infringe the original claims. The third party may be using a device or manufacturing a product claimed in the reissue patent and described, but not claimed, in the original patent. In such instances, the doctrine of "intervening rights" arises to protect the third party from liability for infringing broadened reissue claims.

The doctrine of intervening rights provides a defense to an action for infringement of reissue claims, but the defense may not be used in suits on original claims or on narrowed reissue claims. The defense is usually considered to be personal to the party who actually practiced the invention disclosed but not claimed in the original patent. However, there are decisions which seem to hold that the right may be transferred to any party sued on the broadened reissue claims. In any event, it is important to note that intervening rights do not affect the validity of a reissue claim, but merely give rise to a defense against an infringement action based on certain reissue claims.

From all that has been stated, it is clear that there are some very specific limitations on remedying defects in a patent by means of a reissue. Inoperativeness or invalidity of the patent together with inadvertance, accident, or mistake without fraud must be shown. A second examination of the application follows, and

[1] C. C. A. Del. 1952; 129 F 2nd. 608.
[2] C. C. Ill. 1882; 12 F. 127.
[3] C. C. A. N. Y. 1931; 47 F 2nd. 545.

the applicant must sometimes prove that there was no unreasonable delay in filing his reissue application. Despite these limitations and strict requirements, the reissue patent is a powerful tool for securing to the inventor his full rights in those instances where all of the conditions can be met.

The Disclaimer

Patentees sometimes discover that they have claimed more than they have a right to claim in their issued patent. In such cases, it is not necessary to apply for a reissue patent. A statutory remedy, called a "disclaimer", is available for this purpose. The disclaimer is similar to the reissue in that "inadvertance, accident or mistake" without "fradulent or deceptive intention" must be shown. It differs from the reissue in that it is not reviewable by the Patent Office and does not, therefore, lay the original patent open to re-examination.

The simplest and probably most frequent use of the disclaimer is to cancel an entire claim (or a number of claims) from an issued patent. Notice of the filing of disclaimers may be found in almost any issue of the *Official Gazette* of the United States Patent Office. For example, in the August 12, 1952, issue, the following notice appears under the heading "Disclaimers":

"2,502,553—Albert P. Ball, Detroit, Michigan. Sink Assembly. Patent dated April 4, 1950. Disclaimer filed July 18, 1952, by the assignee, Buggs Manufacturing Company.

"Hereby enters this disclaimer to claims 8 and 10 of said patent."

A copy of the notice is attached to each copy of Patent No. 2,502,533, and the effect of the disclaimer is to cancel claims 8 and 10 of the patent as of the date of the issuance of the patent.

The purpose of the disclaimer is to protect inventors from the application of the old rule that a patent containing an invalid claim was completely void. The parts of a patent not disclaimed are not affected by the disclaimer and, therefore, valid claims are still enforceable once the invalid claims have been cancelled. However, failure to cancel claims known to be invalid may render even valid claims unenforceable. Thus in the case of United Lens Corporation v. Doray Lamp Company[4], it was declared that "patent claims, relating to automobile headlight lenses, were invalid or at least unenforceable because of the owners' failure to disclaim the seven claims of the same patent which had been held invalid by the Court of Appeals."

It is not necessary to wait for a court decision before filing a disclaimer. Once a patentee is convinced that his claim is too broad or invalid, he may proceed with the filing of his disclaimer. On the other hand, once there has been a court decision holding a claim to be invalid, the patentee or assignee must either appeal the decision or file a disclaimer promptly. If he does not, he may jeopardize his remaining claims. The "reasonable time" test is usually applied in determining how soon after decision of the court the disclaimer must be filed.

Disclaimers may be filed by the patentee or the assignee. Grantees may file disclaimers, but such disclaimers apply only to the territory covered by the grant. Disclaimers may be filed by submitting a statement, such as the one above, together with the proper fee and a statement of the interest of the person making the disclaimer. The disclaimer must be in writing and attested by one or more witnesses.

Interference

An interference proceeding is a contest within the Patent Office to determine which of two or more persons claiming the same invention is the first inventor. We ordinarily think of interference proceedings as involving applicants for patents. However, a patentee may also find himself a party to the contest in spite of the fact that a patent has already been issued to him.

During the first year after the issuance of a patent, any person who has made the same invention may copy the issued claims in a pending or new application and bring about an interference proceeding. If the patentee is the loser in the contest, the Commissioner of Patents may issue a duplicate patent to the winner, even though he may not cancel the patent already issued. Meanwhile, the original patentee must disclaim the claims lost in the interference if he wishes to retain and enforce the claims that were not involved.

The subject of infringement can only be touched on in this discussion. However, every holder of a patent should realize that a patentee, practicing his own invention as defined by his issued claims, may be infringing another patent. This can happen because the granting of a patent confers only the right to prevent others from making, using, or selling the patented invention. The right to use the invention may or may not exist. If it does exist, it existed before the patent was granted and cannot be affected one way or the other by the patent grant. This may be more readily understood when we realize that most current inventions are improvements on existing inventions. Thus, for example, a person who invents and patents a new shutter mechanism for a camera does not obtain thereby the right to make, use, or sell a camera embodying such a shutter. He may prevent others from

[4]C. C. A. Ill. 1938; 93 F 2nd. 969.

right to infringe the patents of others so that he might use his shutter. In such situations, the happiest solution is often a cross-licensing arrangement whereby incorporating his shutter in their patented (or unpatented) camera. However, he has been granted no the camera patentee extends rights in the making, using, or selling of the camera in return for the right of embodying the shutter in his camera.

Action for a declaratory judgment is very closely related to the subject of infringement. The patentee who threatens suit against an alleged infringer, or who brings suit for infringement, is likely to find himself a defendant against a request for a declaratory judgment of invalidity or non-infringement. This may happen because parties threatened with infringement suits may seek a judicial declaration of the invalidity of the patent upon which a suit is threatened. In the same manner, a party actually sued for infringement may seek a judicial declaration that the patent upon which he is being sued is invalid. Of course, the burden of proving invalidity rests upon the party making the assertion. The presumption of validity will always be in favor of the issued patent, but the presumption may be overcome.

The following example will help to illustrate the situation. In this fictitious case, Company A owns a patent that Company B is believed to be infringing. Company A threatens suit against Company B unless the latter stops the infringing acts or takes a license under Company A's patent. This threat of a suit may be enough to permit Company B to go into court and bring an action for declaratory judgment of the invalidity or non-infringement of Company A's patent. If Company A should actually bring suit against Company B for infringement, Company B may either assert invalidity of the patent as a defense, or seek a declaration of invalidity by way of counterclaim. In any of the above actions, all the claims in the patent may be put in issue, even though the patentee alleges infringement of only one or two claims.

Misunderstandings About Patents

The peculiar characteristics of patents as property should be recognized by every patentee. Assignments, licenses, and grants of patent rights are common, and the legal problems involved in these transactions are usually recognized by patentee, assigness, and others involved. However, there is a common misunderstanding of the rights conferred upon the owner of an undivided portion of a patent. Thus, it is commonly assumed that retaining 51 per cent or more of the patent assures control. This is not true. The owner of even one-hundredth part of a patent may license the entire process or products in complete independence of the owner of the other 99 parts. Indeed, it appears that the owner of the single part may do anything in regard to the patent that the owner of the 99 parts may do.

Another rather general misunderstanding is that since patents are Federal grants, states may not exercise any control over them or transactions relating to them. This is not the case, and the patentee would do well to acquaint himself with any regulations on patents in those states where he does business. As an example of such a regulation, the law of Ohio requires that promissory notes or other negotiable instruments given for a patent right, must bear the words "Given for a patent-right" prominently and legibly written or printed on the face of the instrument, above the signature.

In this short article, an attempt has been made to mention and describe in some measure the problems that may arise in connection with a patented invention even after a patent has been granted. It has been pointed out that the patentee may find himself back before the Patent Office in connection with reissue prosecution, interference proceedings, disclaimers, or other administrative operations affecting his patent. Furthermore, court proceedings relating to infringement matters, declaratory judgment proceedings, tax matters, and other judicial considerations may arise. Truly, the issuance of a patent is but the beginning and should not be looked upon as a conclusion and final determination of the rights of the inventor and those who succeed him.

"We need a widespread understanding of science in this country, for only thus can science be assimilated into our secular cultural pattern."—*James B. Conant*

Tailor-Made Concrete

by JOHN A. SLYH

The author served as a chemical engineer with the National Carbon Company after graduating from The Ohio State University in 1935 with a degree in ceramic engineering. He has been associated with Battelle since 1946 in heavy chemical and ceramic process research and development.

MODERN TECHNOLOGY has been doing some surprising things in the development of special products for special uses. The construction industry is one of the latest to benefit from materials that are made-to-order for specific jobs.

One "tailor-made" product that is of great interest to builders is concrete made from lightweight aggregates. The aggregates now being used widely in concrete include such materials as expanded clay or shale, instead of the conventional gravel or crushed-rock materials, commonly termed heavy aggregates. More extensive nationwide use of these relatively new building materials is expected as the benefits to be derived from their use become better known and appreciated.

Lightweight aggregate concretes can be "tailor-made" so that economic and design advantages can be realized from their properties without losing necessary strength. In addition to lighter weight, these properties include "nailability", ease of cutting or channeling, and capacity to absorb sound, reflect heat, and resist fire.

"Tailor-made" aggregates can be made from a variety of materials. The most frequently used materials are clay or shale, wastes from coal mines, and perlite, pumice, and vermiculite. Concretes made from these materials vary in weight from one-fifth to three-fourths the weight of gravel- or crushed-rock aggregate concrete, which averages about 150 pounds per cubic foot.

POSSIBLE USES

It must be realized that lightweight-aggregate concretes are not going to replace heavy-aggregate concretes. Their increasing importance, for the present at least, is based on use for structural framing, where there are limitations in weight, as in bridges and multistory buildings. They are also finding wider acceptance for applications where soundproofing, fireproofing, and heat insulation is particularly vital, and for floor and wall fillings where the extra expense and weight of heavy concrete is unecessary to do the job.

Outstanding among recent successful uses of lightweight concretes is the office building of a large life insurance company in Los Angeles, California. This building was specially designed to resist earthquake forces. Another example is the San Fransicso-Oakland Bay Bridge. It was reported that use of lightweight concrete for the bridge saved the builders an estimated three million dollars in reinforcing steel.

Lightweight concretes have not yet been used extensively as a general purpose building material for home dwellings. A number of single-dwelling units were constructed in the Pacific Coast Region during World War II, employing precast wall and roof slabs made of perlite concrete. The experiment did not expand, however, and wood, brick, and stucco still have a firm grip on this market. Some expansion in the use of lightweight concrete materials for special purposes, however, is in prospect. A New Jersey manufacturer, for example, is making a precast vermiculite plank that has been approved for roof construction use in all five boroughs of New York City. The use of perlite instead of sand in plaster ground coats is becoming increasingly popular with plasterers. They find the new material "works" well and is easier to handle because of its light weight.

PROCESSING CLAY AND SHALE

The expression "it's not what you do but the way that you do it" is particularly true in the making of lightweight aggregates. Clay and shale, for example, normally are the raw materials used to make dense brick and tile. However, when heated very rapidly, these substances puff, or bloat, and if chilled quickly, the cell-like structure is preserved. If the heating is overdone, or if chilling is not done at the right moment, strength and other desirable properties will be lost.

Clay and shale seem to offer the most promising potentialities for more extensive development of the lightweight-aggregate-concrete industry on a nationwide scale. They are available in sizeable quantities in every state of the Union. Consequently, processing

plants can be set up close to both raw materials and consuming markets. Transportation costs can thereby be minimized.

Where plants processing clay or shale for brick, pottery, or tile are already established, the addition of a lightweight aggregate unit can create new uses for already available raw materials. According to a recent study made by Battelle, the Ohillco region of southeastern Ohio, famous for its clay products, falls into this category.

Sources of Lightweight Aggregates

Although the number of expanded-clay-aggregate plants has jumped in recent years, many states are still without them. According to a recent count, there are 23 plants in the nation located as follows: Texas, 6; Illinois, 3; Missouri, California, Ohio, and Louisiana, 2 each; and New York, Oregon, Tennessee, Utah, Virginia, and Washington, each 1. Our best estimate of the use distribution of expanded clay or shale shows that 70 per cent goes into concrete block, 25 per cent to structural concrete (roof, pier, floor, and foundation fills), and 5 per cent into precast concrete shapes.

Perlite and vermiculite do not share the advantage of wide distribution enjoyed by clay or shale. The main concentration of perlite is in the western states. Vermiculite is mined principally in Montana and South Carolina. Perlite and vermiculite, furthermore, are not generally considered to be competitive with other lightweight aggregates whose principal use is in making concrete. Perlite and vermiculite have had their growth in such uses as plaster, ground coats, floor fillings, and heat insulation.

For many years, ceramic scientists, architects, and engineers have been searching for lighter building materials than those conventionally in use. By resorting to unconventional raw materials, they have come up with lighter weight concretes that can do certain jobs as well as, or better than, concrete made from gravel or crushed-rock-aggregates. They have also developed more efficient materials for special applications such as heat insulation, and sound absorption. More extensive nation-wide use of these relatively new materials is in the offing as their advantages are more generally realized.

In 1822 the Danish physicist, Oersted, at the end of a lecture happened to bring a wire joined at its two extremities to a voltaic cell, to a position above and parallel to a magnetic needle. At first he had purposely held the wire perpendicular to the needle but nothing happened, but when by chance he held the wire horizontally and parallel to the needle he was astonished to see the needle change position. With quick insight he reversed the current and found that the needle deviated in the opposite direction. Thus by mere chance the relationship between electricity and magnetism was discovered and the path opened for the invention by Faraday of the electric dynamo. It was when telling of this that Pasteur made his famous remark: "In the field of observation chance favours only the prepared mind."—W. I. B. Beveridge in *The Art of Scientific Investigation*

A Look Ahead at Forest Products Research

From a paper presented by Dr. J. A. Hall, Director of the Forest Products Laboratory of the Department of Agriculture's Forest Service. Presented before the Upper Mississippi Valley Section of the Forest Products Research Society.

IN THE USE OF solid woods we still need to set up standards for the use of wood as a material in accurate engineering. Our testing methods are cumbersome and wasteful. Moreover, there is a great spread in the wood properties within a single species. As intensive forest management develops, we shall probably grow wood with more uniform properties. We should be able to develop fundamental research in the relation of microscopic structure to mechanical qualities and thus methods of accurately predicting strength. We should be able to develop nondestructive methods for testing engineering structures and learn more about fatigue in wood.

With regard to methods of joining wood, our glue lines are too expensive and our joints not as strong as they ought to be. An approach along the lines of the fundamentals of adhesion probably will be most productive. The Duo-Kerf saw points the way toward cheaper glue lines because it makes possible a wood surface satisfactory for gluing at less cost. The same approach might be applied to wood-cutting tools.

In the field of modified woods, we have not succeeded in developing a cheap, satisfactory way of getting dimensional stability. We need further fundamental research in the surface chemistry of wood and must watch developments in the chemical industry to help solve this problem.

Most of our work in fireproofing has been empirical. We have little fundamental information about the reasons for the lowering of the combustibility of wood by certain treatments. There is room for exploration both of impregnation and surface treatments.

We can look forward to cheaper and better preservatives that will give protection against decay without interfering with appearance and gluability. Again we shall be dependent upon the chemical industry unless we find the answer for the question, "Why are our durable species durable?".

Sandwich materials, which are in effect paper in the form of either fiberboard or honeycomb construction, appear to have a wide field of usefulness due to their ususual combination of light weight with great strength. We shall hope for cheaper resins for bonding and impregnation and cheaper and better sandwich material. It will be the task of research to explore new resins, new combinations of materials, and new shapes and forms among the infinite variety to be considered.

There are large unexplored fields of development in textile fibers based on wood. We shall look forward to further developments in methods of producing cellulose of controlled properties from a wide range of species. We very greatly need simple, cheap methods of pulping adaptable to smaller aggregations of capital.

Work must continue on the fundamentals of wood structure. Our knowledge of the mechanics by which liquids enter into wood structure and move through it has already given rise to important new products. There is no reason to believe this field is exhausted or even well explored.

We still fall short of realizing processes upon which to build the number of permanent industries that appear feasible. We still fail to characterize lignin completely. One may almost say that we have failed to isolate reproducible lignin. The so-called pentosan fraction still seems to offer rich rewards in usefulness; but a vast amount of technological research remains to be done.

In recent years, we have come more and more to realize the relationship of utilization to forest management. Our research is more and more oriented toward utilization of unused species and utilization by industry of the offal from other forest products industries. This is as it should be, but we are quite over-balanced in the direction of applied research. I am convinced that we must build nationally a fundamental research program in wood, whether in mechanics, in kiln drying, in preservation, in fiber products, or in chemistry. We are still dealing with an extremely complex biological material and we can never know too much about the fundamentals of wood.

Notes From Battelle

ENGINEERING CENTENNIAL PAPERS

"Our annual energy demand in the United States of close to 40,000 trillion Btu is the equivalent of about 55 billion humans working 8 hours per day every day of the year," according to Richard J. Lund, who heads engineering economics research at Battelle.

Lund's paper, "Demands for Energy," which was presented in Chicago last month before the Energy Symposium of the Centennial of Engineering, traced the growth of energy use in the United States. At the present time, he finds about one-third of energy is consumed by each of these three fields: domestic and commercial heating, transportation, and manufacturing. Dr. Lund also points out that "Comfort, convenience, and economy in costs have combined to shift large segments of major users away from coal over to petroleum products and natural gas in the (last) half century under review."

John D. Sullivan, Battelle assistant director, presented a paper on "Nonmetallic Minerals" before the Mineral Industries Symposium of the Centennial. He stressed the significance in our national economy of nonmetallic minerals in comparison with metals and other engineering materials, and he pointed out the important role that nonmetallics play in engineering and in setting our standard of living. He concluded with the statement that because of the raw materials supply situation, nonmetallic minerals will play a more important role in our future engineering economy.

As chairman of the Mineral Industries Symposium, Battelle Director Clyde Williams summed up progress in the field. He found that the engineer "with his demand for more and more information to use in solving his practical problems, is one of the great motivating forces behind our progress in applied research and technology."

STRESS IN LARGE GAS PIPE

In recent years there have been occasional failures in large-diameter gas transmission pipe. Why the pipe should fail after installation was a puzzle. In some cases it had been subjected to a higher internal pressure in tests at the mill than it received in use. Battelle engineers undertook research on the problem which was reported before the American Petroluem Institute last month by George K. Manning.

As part of the research, short sections of buried pipe were studied in order to learn how stresses could develop after pipelines were installed. It became apparent that flat spots and dents in thin-wall large-diameter pipe will cause large local bending stresses when internal pressure is applied to the pipe. Local plastic deformation may result the first time pressure is applied to the line. The flat spots may be formed in a number of ways after the tests at the mill. It was also found that stress in a pipe wall fluctuates because of changing soil pressures. These variations in stress may be as much as the stress caused by 50 psi variations in internal pressure. It was also discovered that the bending stress caused by flat spots and the nominal stress caused by pressure together may easily exceed the yield strength of the steel.

A pipeline should be proof-tested after construction. This may be done by applying pressures that will create greater stresses than those that might result from a combination of service pressure together with changing soil pressures and temperatures. This test would be in addition to the mill test and should also determine whether the pipe has been damaged in between the time it left the mill test and the time it is completely installed and ready for service.

CERAMIC-COATED WELDING "BACKUP"

When two pieces of steel plate are to be welded, the ends to be welded together are cut to a V-shaped angle. The cut is made so that when the pieces are placed together, a deep trough is formed. To get a clean weld on the first pass of the welding arc, some type of "backup" is used at the center of the V-shaped trough.

Steel backups have been used for many years, but must be removed by chipping. Chipping is expensive in mass production. Copper was found to be better because it could be removed without chipping. However, the metal deteriorated in the welding operation, and some means had to be found to protect it and prevent copper from melting into the welds.

Battelle welding engineers tackled the job of finding a good backup material that would conserve copper. They tried solid ceramics and metals coated with ceramics. Finally, a satisfactory ceramic coating for copper was developed. It did not stick to the weld nor contaminate the metal of the weld seam. It did extend the life of the copper. In addition to its usefulness as a backup material, the coating can be used to prevent sticking of welding splatter to metal.

PAPER AT PARIS CONGRESS

Studies of the mode of action of a closely related series of fungicides (the sodium dimethyl-, diethyl-, and di-n-propyl dithiocarbamates) were reported in September before the Third International Congress of Phytopharmacy in Paris, by Dr. K. Starr Chester, of Battelle. The research shows that this type of fungicide is most fungicidal in the un-ionized state. Investigation of the physical chemistry of the interaction of these compounds with fungus spores did not indicate any direct relationship between sorption and fungicidal activity under experimental conditions used.

Dr. Chester concluded that "The fungicidal action-sorption function may be more complex and may require a more analytical study of the actual site of action in order to distinguish between superficial and internal sorption. On the other hand, fungicidal action may not correlate with sorption and could be due to minor chemical dissimilarities of the sodium dialkydithiocarbamates." His paper, "Fungicidal Action of Sodium Dialkyldithiocarbamates: A Progress Report," was based on a study using radioactive tracer techniques, that was jointly sponsored by the Atomic Energy Commission and Battelle.

Dr. Chester also served as chairman of the section meeting of the Paris Congress that dealt with the work of the International Commission on Plant Disease Losses. This commission seeks the exchange of ideas and information between countries on the subject of plant disease losses.

ELECTROPLATING ON BERYLLIUM

Beryllium is a light, hard, brittle metal. It is lighter than aluminum and heavier than magnesium. Metallurgical and mechanical fabrication of beryllium are complicated by its brittleness. As one machinist decribed the problem: "Treat the stuff as glass." The problem of plating the metal has also been difficult to solve.

John G. Beach and Charles L. Faust dealt with the plating problem in a paper given before the Electrochemical Society at its Montreal meeting. Their research indicated that many of the difficulties in electroplating beryllium resulted from overlooking surface metallurgy. The process which they reported includes preliminary surface preparation involving descaling, removal of greases, oils, and dirt, and chemical polishing. After cleaning, an activating pickle of 10 per cent (by volume) of concentrated sulfuric acid is used. Thereafter, plating may be done directly onto the beryllium surfaces or onto an adherent, immersion-zinc film on the beryllium surface.

Through the use of various plating baths, it was found that aluminum, chromium, copper, iron, nickel, silver, tin, and zinc could be plated on beryllium. Other electroplated metals can be applied directly on beryllium or over another metal that can be electrodeposited directly.

FOUNDRIES AND AIR POLLUTION

Each foundry finds itself in a special situation in regard to the problem of air pollution. Problems differ from foundry to foundry because of differences in operation and location. The solution of these problems calls for cooperation between the foundryman and the local air-pollution authorities.

N. H. Keyser and H. P. Munger of Battelle, writing in the American Foundry Society *Transactions*, volume 60, describe the already perfected technical methods for controlling air pollution in foundries. These include dry inertial collectors, wet scrubbers, filtering methods, and electrostatic precipitators. They also describe several newer methods now going through production-development stages.

The cost of controlling air pollution depends largely on the amount of cleaning required by local conditions. Keyser and Munger report that there are usually savings from air cleaning that help to offset the costs to the foundry. The remaining costs, however, must be shared by the public, which is the ultimate beneficiary.

MERCURY SEAL FOR POWER SHAFTS

Sealing off a vacuum chamber where operations involve use of a power drive is difficult to accomplish. However, an effective solution of the problem has been devised by Battelle engineers. They have developed a method of preventing leakage around a power drive by the use of a seal that rotates independently of the drive shaft. Mercury, oil, or water may be used as sealing fluids, depending upon the application of the seal.

During operation, the fluid is forced to the outside of the sealing chamber by centrifugal force. The seal is completed when the liquid closes the leakage path between the vanes and the rotating annuli containing the mercury. The seal is effective even though the drive shaft is not rotating.

Methods were found for preventing both turbulence in and heating of the sealing liquid. Turbulence is reduced by the use of mesh-screen baffles for driving the liquid. Heating is prevented by cooling fins on the periphery of the main rotor containing the sealing liquid. A shaft seal of this type may find use in atomic energy work and in similar applications.

RECENT PAPERS BY THE RESEARCH STAFF*

Properties of Some Hydrogen-Sintered Binary Molybdenum Alloys. W. L. Bruckart, M. H. LaChance, C. M. Craighead, and R. I. Jaffee. American Society for Metals, *Preprint* 36, 1952.

Melting Practices for Magnesium-Base Alloys. L. W. Eastwood. *Canadian Metals*, August, 1952.

Tentative Design of Horizontal Gating Systems for Light Alloys. L. W. Eastwood. American Foundrymen's Society, *Symposium on Principles of Gating*, 1951.

The Influence of Insoluble Phases on the Machinability of Titanium. R. M. Goldhoff, H. L. Shaw, C. M. Craighead, and R. I. Jaffee. American Society for Metals, *Preprint* 30, 1952.

Los Informes Technicos son Esenciales para la Buena Administracion. J. B. Holding and J. D. Wallace. *Ingeniera Intl. Industria*, September, 1952.

The Technology of Titanium. R. I. Jaffee and J. M. Blocher. *Modern Metals*, August, 1952.

The Engineering Approach to Cleaner Air for the Community. H. P. Munger. *American Journal for Public Health*, August, 1952.

An Investigation of Antimony Oxide as an Opacifier for Porcelain Enamels and Glass. A. E. Pavlish and L. S. O'Bannon. *Science*, August 22, 1952.

How Newspaper Printing Can Be Improved. J. Homer Winkler, *Southern Printer*, August 15, 1952.

*In most cases, reprints will be available from the Battele Publications Office upon request.

A Word About Battelle Technical Review Abstracts

The abstracts that appear in the following pages are prepared from approximately 900 American and foreign technical journals, as well as from books and other literature received in the Battelle Library. Prepared by a professional staff trained in various technological fields, the abstracts are selected for their usefulness to the Battelle research staff. They are now being made available to technologists and scientists in industry and research in all parts of the world, through the pages of the *Battelle Technical Review*.

BATTELLE TECHNICAL REVIEW ABSTRACTS

SECTION INDEX

AGRICULTURAL RESEARCH 766a
Plant and animal nutrition; insecticides; fungicides; fertilizers; weed control; soils; etc.

ANALYSIS—CHEMICAL AND PHYSICAL 735a
Methods and apparatus for qualitative and quantitative determination of the composition of matter.

APPARATUS, METHODS, AND STANDARDS 739a
Industrial measurement, inspection, and control; laboratory equipment and procedures (except when auxiliary to other subjects); standards and specifications.

CERAMICS 749a
Abrasives; inorganic cements; glasses; ceramic coatings; structural clay products; refractories; whitewares.

CHEMICAL TECHNOLOGY 754a
Chemical engineering and process equipment; chemistry of materials such as wood, paper, textiles, and coal and petroleum by-products; petroleum refining.

CHEMISTRY—GENERAL, INORGANIC, AND PHYSICAL 756a

CHEMISTRY—ORGANIC 760a

CLEANING, FINISHING, AND COATINGS—METALLIC 720a
Buffing and polishing; chemical and electrochemical cleaning and coatings; diffusion, dip, oxide, sprayed, weld-deposited, and vapor-deposited coatings; cladding.

CORROSION 734a
Theory, measurement, and prevention (except by means of coatings).

DESIGN 752a
Design of parts, equipment, and structures (except when auxiliary to other subjects); theoretical stress analysis.

ELECTRICITY AND ELECTRONICS 773a
Electrical and electronic theory, circuits, equipment, and applications (except when auxiliary to other subjects).

FOUNDRY PRACTICE 714a
Melting; casting; pouring; rigging; shakeout and trimming; molding; core and pattern making; metallurgical control.

FUEL TECHNOLOGY 745a
Solid, liquid, and gaseous fuels—their properties and combustion; carbonization, liquefaction, and gasification of solid fuels; synthetic fuels. (For combustion in engines, see Section 21.)

GRAPHIC ARTS 777a
Printing and decorating processes, equipment, and materials; book manufacture; photography.

HEATING, DRYING, AND AIR CONDITIONING 747a
Space heating; cooling; humidification; materials drying and heating; equipment such as ovens, boilers, furnaces, heat pumps, and auxiliaries.

LUBRICATION AND FRICTION 752a
Lubricants and lubricating methods; friction fundamentals; nonmetallic bearing materials; oil filtration; lubricating-system design.

METALLOGRAPHY AND PRIMARY STRUCTURES 722a
Microscopy, diffraction methods and other techniques; phase diagrams; nuclear and crystal structures; microstructures; macrostructures. (For structures resulting from transformation or deformation see Sections 11 and 13, respectively.)

METALS—FABRICATION AND USES 744a
Miscellaneous fabrication procedures; applications of metals, alloys, and specific processes.

SECTION INDEX (Continued)

METALS—MECHANICAL PROPERTIES AND TESTS 727a
Elasticity and plasticity; stresses and stress analysis; fracture; creep; shear; hardness; fatigue; wear resistance; deformation structures.

METALS—PHYSICAL PROPERTIES AND TESTS 725a
Mass, thermal, thermodynamic, chemical, electrical, magnetic, and optical properties.

METALS—PRIMARY WORKING 715a
Preparation for working; forging; rolling; extrusion; swaging; tube making; wire and rod drawing; slitting, sawing, shearing, etc.

METALS—SECONDARY WORKING 716a
Drawing; impact extrusion; forming; stamping; machining and machinability; grinding; honing and lapping; strain hardening; shot peening; flame cutting.

METALS—SMELTING, REDUCTION, AND REFINING 712a
Smelting and reduction of ores; distillation of metals; electrolytic winning and refining; thermit processes; cementation; amalgamation; carbonyl, halide, and hydride processes; ingot practice.

METALS—THERMAL TREATMENT 719a
Homogenization; annealing; normalizing; patenting; quench, precipitation, and case hardening; tempering; stress relief; cold treatment; heating and cooling media. (For effects of thermal treatment, see Sections 11, 12, and 13.)

METALS—TRANSFORMATIONS AND RESULTING STRUCTURE 724a
Diffusion; nucleation and grain growth; recovery and recrystallization; allotropic transformations; precipitation; eutectoid reactions; other solid-state reactions; liquid-phase reactions; solid-liquid, vapor-solid, and vapor-liquid reactions.

METALS—WELDING OR JOINING 718a
Welding; soldering; brazing; weldability and weld tests; bonding metals to nonmetals; adhesive bonding; mechanical fastening.

MISCELLANEOUS 779a
Research and research organizations; general metallurgical articles; mathematics; medical research; patent law; other unclassified subjects.

ORE AND MATERIAL BENEFICIATION 711a
Preparation and concentration of solid materials; roasting; calcining; sintering; nodulizing; briquetting; mineralogy.

PAINTS, VARNISHES, LACQUERS, AND ENAMELS 765a
Organic and inorganic coatings (except ceramic coatings); their composition, properties, application, and testing.

PHYSICS 769a
Theory and practice (except as covered in other sections). Includes aerodynamics; biophysics; flow of gases and liquids; deformation of solids; heat transfer; nucleonics; semiconductivity and superconductivity; ultrasonics; etc.

PLASTICS AND HIGH POLYMERS 762a
Polymerization; properties; testing; processing methods and equipment; compounding. (Does not include rubbers and surface-coating resins.)

POLLUTION AND WASTES 745a
Sampling, analysis, collection, prevention, and treatment of gaseous and liquid wastes, including smoke, fumes, odors, fly ash, dusts, aerosols, sewage, and industrial wastes; by-product recovery; meteorological, topographical, and biological effects.

POWDER METALLURGY 717a
Powder production and properties; mixing; compacting; sintering; post-sintering operations.

PRIME MOVERS 748a
Reciprocating engines; turbines; jet engines; rockets; locomotives; auxiliary equipment; power from atomic fission.

RUBBERS AND OTHER ELASTOMERS 764a
Polymerization; properties; testing; processing methods and equipment; compounding.

STATISTICS AND ECONOMICS 778a
Natural resources; supplies; production and cost data; articles on economic trends.

BATTELLE TECHNICAL REVIEW

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ABSTRACTS†

October 1952

1. ORE AND MATERIAL BENEFICIATION

12991* Further Development of the Hammer Mill. (German.) K. Jütte. *Brennstoff-Wärme-Kraft*, v. 4, Aug. 1952, p. 253-258.

Describes requirements the hammer mill must meet. Proposes simplifications of construction. The problem of wear, sorting, regulation, and future possibilities of development are indicated. Charts, diagrams, and photographs.

12992 Narrow-Cut Stripping and Calcium-Chloride Washing. *Coal Age*, v. 57, Sept. 1952, p. 80-85.

Describes and illustrates strip-mining and coal-cleaning operations of Saxton Coal Corp., Petersburg, Ind. Includes equipment diagram and illustrations.

12993 Rebuilding for Long-Term Cleaning Results. *Coal Age*, v. 57, Sept. 1952, p. 98-103.

Gives details of heavy-density coal-washing plant of Gulf Smokeless Coal Co., Tams, W. Va. Tables, flow diagrams, and illustrations.

12994* Froth-Flotation of Fines. G. S. Haslam and R. H. Ruddy. *Colliery Guardian*, v. 185, Aug. 7, 1952, p. 155-160. (A condensation)

Describes characteristics of untreated coal fiines and of filter cake as produced. Gives general notes on froth-flotation and drying equipment and procedures, and on uses of the fines. Discusses economics of the process.

12995* Study in Flotation Frothing—Surface Tension: Air-Solution. S. A. Wrobel. *Bulletin of The Institution of Mining and Metallurgy*, Aug. 1952; *Transactions*, v. 61, 1951-1952, p. 505-517.

Apparatus and technique for determining surface tensions of frother solutions are described. Variation in surface tension of pine oil with time was measured and results are discussed. The term "air-bell carrying strength" as a specific characteristic of flotation frothers is introduced and defined. 11 ref.

12996* Studies in the Utilization of Non-Caking Indian Coal. Part V. Utilization of Briquettes Prepared From Tandur Coal in the Electric Smelting of Iron Ores. M. S. Iyengar. *Journal of Scientific & Industrial Research*, v. 11B, June 1952, p. 241-245.

Briquettes prepared from Tandur coal by application of the lime-tar reaction were subjected to low-temperature carbonization and their electrical conductivity and reactivity measured. Possibility of their use as reductants in electric smelting of iron ores is discussed. Diagrams.

12997 Deming Mill—A Materials Handling Problem Solved. Norman Weiss and H. W. Kaanta. *Mining Engineering*, v. 4, Sept. 1952, p. 857-862.

Equipment; layout; and metallurgical control and recoveries at American Smelting & Refining Co.'s new mill, Deming, New Mexico. Pb, Zn, and Ag are recovered. Photographs, flowsheet, diagrams, and tables.

12998 Glass and Chemical Sand Manufacture in the Edwards Paddle Scrubber. Will Mitchell, Jr., T. G. Kirkland, and R. C. Edwards. *Mining Engineering*, v. 4, Sept. 1952; *Transactions of the American Institute of Mining and Metallurgical Engineers*, v. 193, 1952, p. 875-879.

A scrubber of new design for the beneficiation of glass and chemical sands. The machine is described and its capacity and metallurgical efficiency compared with the performance of other sand cleaning devices. Flowsheet, photographs, and tables.

12999 Drainage Behavior and Water Retention Properties of Fine Coal. D. W. Gillmore and C. C. Wright. *Mining Engineering*, v. 4, Sept. 1952; *Transactions of the American Institute of Mining and Metallurgical Engineers*, v. 193, 1952, p. 886-894.

Laboratory investigation of gravity drainage phenomena to provide basic data for predicting drainage behavior in cars, bunkers, basins, and silos, and to obtain some understanding of moisture retention properties of fine coal. Apparatus diagram, table, and graphs.

13000 Comparative Effectiveness of Coal Cleaning Equipment. Orville R. Lyons. *Mining Engineering*, v. 4, Sept. 1952; *Transactions of the American Institute of Mining and Metallurgical Engineers*, v. 193, 1952, p. 895-902.

Presents a method whereby the amount of misplaced material and difficulty of separation can be used to compare coal cleaning equipment of all types, from effectiveness and capacity standpoints. Available operating data are given for 105 large scale tests on a great variety of equipment. Capacity data are also given for many tests. Tables and graphs. 30 ref.

13001* Flexibility in Zinc Milling. *Mining World*, v. 14, Sept. 1952, p. 57-60.

Peru Mining Company's Deming, New Mexico, flotation mill treats two types of Zn ore from company mines and custom shippers in two parallel circuits. Flowsheet and photographs.

13002* Crushing Practice and Theory. Part IX. Special Types of Roll Crushers. Brownell McGrew. *Rock Products*, v. 55, Aug. 1952, p. 164-165, 168, 188.

Diagrams and illustrations. (To be continued.)

13003* Recovery of Precious Metals. *Times Review of Industry*, v. 6, Aug. 1952, p. 29-30.

Describes various methods for concentration of the above when found associated with base metals. Includes smelting and refiing. 6 flow sheets.

13004* Preparation of Coal for Industry. D. R. Mitchell. *Utilization*, v. 6, Aug. 1952, p. 30-32.

Discusses complexities of coal preparation with regard to meeting the requirements of industrial coal users. Tables and graphs.

Miscellaneous Publications.

13005 Investigation of Churn Drill Sludges for Western Mining Corporation, Ltd. Commonwealth Scientific and In-

†Prepared from books, journals, and other material received by the Battelle Memorial Institute Library.

1. *Ore and Material Beneficiation*

dustrial Research Organization and Kalgoorlie School of Mines, Report no. 509, Oct. 10, 1951, 6 pages. (TN44 W52r)

Shows that accurately sampling churn-drill sludges for gold assay is possible by tabling, amalgamating the concentrate, and assaying the various products. Tables.

13006. Electrostatic Concentration of Pyrochlore From Tororo, Uganda, British East Africa. Commonwealth Scientific and Industrial Research Organization and Mining Department, University of Melbourne, Investigation 400, Aug. 30, 1951, 11 pages. (T177 M48i)

Magnetic and electrostatic tests on washed and demagnetized earth from above location were conducted. The material consisted of apatite, and usually contained traces of columbium mineral, pyrochlore, zircon, baddeleyite, tremolite, and a certain quantity of quartz.

13007 Treatment of Cobalt-Nickel Ore From Bogota, Canada, New Caledonia. Commonwealth Scientific and Industrial Research Organization and Mining Department, University of Melbourne, Investigation 403, Oct. 23, 1951, 13 pages. (T177 M48i)

Treatment of above was attempted by a number of methods: flotation, tabling, and magnetic concentration were found to be ineffective. Several leaching methods were tried but only 2 were found to be promising. Tables and graphs. 14 ref.

13008 Concentration of a Tin Ore Containing Sulphides From the Ivy Mine, Emuford, Queensland. Commonwealth Scientific and Industrial Research Organization and Mining Department, University of Melbourne, Investigation 405, Nov. 7, 1951, 7 pages. (T177 M48i)

Purpose was to determine whether sulfides in above ore can be satisfactorily separated from the Sn by flotation. Results show that 95% of them can be recovered for a loss of less than 10% of the Sn.

13009 Concentration of Copper-Lead-Zinc Ore From No. 9 Mine, Drake, N. S. W. Commonwealth Scientific and Industrial Research Organization and Mining Department, University of Melbourne, Investigation 406, Nov. 30, 1951, 16 pages. (T177 M48i)

Poor recovery of Au and Cu during flotation of above ore has been a problem for some time. Causes were investigated using mineragraphic examination and flotation tests with different reagents. Results are tabulated and summarized.

See also:
13490 (size-reduction equipment)
13611 (desulfurization of high-S coals)
13627 (coal preparation-conference)
14228 (beneficiation of Co ores)

2. METALS—SMELTING, REDUCTION, AND REFINING

13010* Anodic Carbon Consumption During Industrial Electrolysis of Aluminum. (Italian.) R. Schadinger. *Alluminio*, v. 21, June 1952, p. 252-256.

Analyzes theoretical relationships among current effeciency, carbon consumption, and anodic gas consumption. Develops formulas for calculation of relationship between theoretical and actual carbon consumption in specific cases. Proves that an important fraction of the carbon is consumed by extraneous processes and not by the electrolysis itself.

13011* Flow Conditions in Hot-Blast Stoves on the Basis of Small-Scale Experiments. (German.) Michael Hansen. *Archiv für das Eisenhüttenwesen*, v. 23, July-Aug. 1952, p. 245-252.

Above investigations were done with the purpose of determining the convective transfer of heat in the dome in dependence upon shape, flow conditions in oval and round burner heads, as well as distribution of the heating gas in the various channels of the burner lattice. Construction details are described and illustrated; results are tabulated. Charts, diagrams, and photographs.

13012 Melt Carbon and Related Open Hearth Problems. Part II. W. J. Frisbie, Jr. *Blast Furnace and Steel Plant*, v. 40, Sept. 1952, p. 1046-1053.

Discussion, calculation examples, and numerous tables are presented in reference to the above. (To be continued.)

13013* Graphic Representation of the Blast-Furnace Operation. (Portuguese.) Janusz Wscieklica. *Boletim da Associacao Brasileira de Metais*, v. 8, Jan. 1952, p. 20-31.

Presents a graphic solution of the principles of the blast furnace process and of means for reducing coal consumption.

13014 Now—Arc Furnace Zinc. *Chemical Engineering*, v. 59, Aug. 1952, p. 246-248.

Temperature is controlled well enough for smelting Zn in an electric arc furnace. Zn vapor quickly quenched, liquefied with novel condenser. Diagrams.

13015 The Reduction of Nickel Oxide in a Fluidized Bed. Arnold Kivnick and A. Norman Hixson. *Chemical Engineering Progress* (Engineering Section), v. 48, Aug. 1952, p. 394-400.

Deals with experiments involving rate of reduction of finely divided solid nickel oxide with hydrogen. The results obtained indicate that both a kinetic-reaction step and a diffusional, or mass-transfer, step affect the over-all reaction rate. Believes that the process may find industrial use for preparaing pure Ni from the oxide. The product at the end of one run was found to be 75% metallic Ni. 30 ref.

13016 Moving in on Manganese. *Chemical Week*, v. 71, Sept. 13, 1952, p. 59-63.

Discusses merits of two new processes for obtaining Mn from domestic ores. Includes cost analysis.

13017* Kinetics of the Removal by Oxidation of Manganese, Silica, and Sulfur From Molten Iron. (French.) A. M. Samarine and L. A. Schwarzmann. *Circulaire d'Informations Techniques*, v. 9, no. 8, 1952, p. 1015-1026. (Translated from *Zhurnal Fizicheskoi Khimii*, v. 22, May 1948, p. 565-574.)

Previously abstracted from original. (Item 2b-199, 1948.)

13018* Kinetics of Carbon Elimination From the Steel Bath. (French.) L. A. Schwarzmann, A. M. Samarine, and M. I. Temkine. *Circulaire d'Informations Techniques*, v. 9, no. 8, 1952, p. 1005-1013. (Translated from *Zhurnal Fizicheskoi Khimii*, v. 21, Sept. 1947, p. 1027-1032.)

Previously abstracted from original. (Item 2b-8, 1948)

13019* Converter Bottoms Made of Metallic Tubes. (French.) André Richard. *Circulaire d'Informations Techniques*, v. 9, no. 8, 1952, p. 1124-1129.

Describes experiments leading to the development of above bottoms. Their construction and savings effected with them are indicated.

13020* Study of Liquid Iron-Phosphorus Alloys by an Electromotive-Force Method. (Russian.) O. A. Esin, L. K. Gavrilov, and N. A. Vatolin. *Doklady Akademii Nauk SSSR*, new ser., v. 85, July 1, 1952, p. 87-89.

The Fe-P system was studied in relation to melt-slag reactions. Data are tabulated and charted.

13021 Ore Reduction; Low-Shaft Smelting in India. R. A. MacGregor. *Iron & Steel*, v. 25, Aug. 1952, p. 375-376.

Discusses special needs of India and the process involved in the Duffield smelter, which is still in stage of proving itself. Also discusses other unconventional iron-ore reduction processes.

13022 Symposium on Firing and Controlling Open Hearth Furnaces. W. H. Kahl. *Iron and Steel Engineering*, v. 29, 1952, p. 55-69.

Consists of the following brief papers: "Open Hearth Furnace Controls", George J. Gockstetter; "Fuel Oil Atomization With Natural Gas", W. A. Peters; "Control of Multi-Fuel Fired Open Hearth Furnaces", R. G. Bryan; "Fuel-Air Ratio Controls for the Steel Industry", L. H. Coleman; "Control Systems for Improved Open Hearth Operation", John R. Green; and "Modern Open Hearth Control", Harry Morton. Schematic diagrams.

13023 The Effect of Emissivity and Flame Length on Heat Transfer in the Open-Hearth Furnace. M. W. Thring.

Journal of the Iron and Steel Institue, v. 171, Aug. 1952, p. 381-392.

Recent developments in port design and aerodynamics of flames are taken into account in calculating optimum flame for the openhearth furnace, by postulating a simplified furnace and flame and calculating in detail the temperatures along the flame and the roof. 4 types of flame are considered, each for 3 different fuel-input rates, and the comparison indicates the optimum flames for 3 distinct phases of the openhearth process —charging, melting, and refining. Graphs and tables. 10 ref.

13024* The Preparation of Silicon-Titanium Alloys by Molten-Salt Electrolysis. (French.) Maurice Dodero. *Journal de Chimie Physique et de Physico-Chimie Biologique*, v. 49, June 1952, p. C11-C14; disc., p. C14.

Describes electrolysis of alkaline and alkalin-earth silicates with addition of TiO_2, electrolysis of potassium fluosilicate with additions of TiO_2, and production of Si-Ti alloys. Includes graphs.

13025 Monterrey Refinery Uses Continuous Lead Softening and Desilverizing Process. G. Ross and S. A. Peabody. *Journal of Metals*, v. 4, Sept. 1952, p. 915-918.

Describes the above method with additional information on decopperizing, dezincing, and debismuthizing.

13026 Use of Oxygen in the Bessemer Converter. W. T. Rogers and L. T. Sanchez. *Journal of Metals*, v. 4, Sept. 1952; *Transactions of American Institute of Mining and Metallurgical Engineers*, v. 194, 1952, p. 933-938.

Presents results of a production experiment evaluating the effect of the above with respect to its relation to blowing time, amount of steel scrap or cold pig iron which can be melted, and teeming temperatures of the molten steel. Graphs and tables.

13027* Separation of Cryolite From Carbon Dust From Aluminium Reduction Furnaces. P. I. A. Narayanan and G. P. Mathur. *Journal of Scientific & Industrial Research*, v. 11A, July 1952, p. 310-312.

Briefly presents 4 methods to accomplish the above. Results are given. Tables.

13028* The Melting of Cuprous Oxide and its Mixtures With Other Oxides. (German.) E. J. Kohlmeyer. *Metall*, v. 6, Aug. 1952, p. 427-429.

Reviews the above on the basis of the literature. Discusses in particular work done with copper oxides alone, with Cu_2O, CuO, and SiO_2, with Cu_2O in Ag_2O, mixtures and molecular compounds with PbO, ZnO, CaO, NiO, Ni_2O_3, Sb_2O_3, Ag_2O, etc. Results should be useful in recovery of Cu from its ores. 10 ref.

13029* Present Developmental Tendencies in the Fire Refining of Copper. (German.) O. Nielsen. *Metall*, v. 6, Aug. 1952, p. 429-431.

Describes historical development leading to processes used at present, such as electric melting and desulfurization process for Cu developed by the author.

13030* The Elimination of Oxygen, Sulfur, and Gases From Remelted Alloys by Means of Lithium. (German.) E. R. Thews. *Metall*, v. 6, Aug. 1952, p. 431-433.

Reviews previous methods for refining of remelted Cu alloys on the basis of the literature. Mechanism of the effect of Li additions is outlined. 25 ref.

13031* Quantitative Study of the Reductive Melting of Ilmenite. (French.) William Freundlich. *Bulletin de la Société Chimique de France*, May-June, 1952, p. 490-501.

Reports on a comprehensive study of all the factors to be considered when reducing ilmenite by melting in the presence of NaOH at elevated temperatures, separating Fe from Ti by forming a melt and slag at the liquid phase. Treats in particular the theoretical basis of such reduction, the role of carbon, the formation of slag, and practical interpretation of the results. Tables and graphs. 14 ref.

13032* Study of Slags of High Titanium Content (French.) William Freundlich. *Bulletin de la Société Chimique de France*, May-June 1952, p. 655-663.

Composition, physical and chemical properties of Ti slag, particularly its reaction with H_2SO_4 and its x-ray structure, were investigated. Tables, charts, and photographs.

13033* Recent Experiences With the Smelting of Iron Ores in the Low-Shaft Furnaces. (German.) Erich Killing. *Stahl und Eisen*, v. 72, July 31, 1952, p. 925-928.

Features of the process. Low requirements of burden and fuels. Preparation of burden. Total flow of materials and heat balance compared with that of the blast furnace. Design of furnace and operation. Results of an experimental operation and economic efficiency of the process. Diagrams.

13034* Report on Work of the Hot Blast Stove Committee. (German.) Werner Feldmann. *Stahl und Eisen*, v. 72, July 31, 1952, p. 928-933; disc., p. 933-934.

Heat-economy considerations regarding design of hot-blast stoves and heat-exchange conditions. Single and multiple-zone hot-blast stoves. Duties of the burner and its varied design. Arrangement and design of the combustion shaft. Adequate shape of the hood and its volume. Comparison of the different types of checkerwork. Insulation of hood and shaft walls. Proposals for comparable investigations. Directions for carrying through measurements on hot-blast stoves.

13035* Certain Intervals Before Transition in the Basic Bessemer Process. (German.) Karl Georg Speity and Helmut Bücken. *Stahl und Eisen*, v. 72, July 31, 1952, p. 934-935.

Time measurement was inadequate, hence quantity measurement was required. Design of a chart for different quantities of pig iron and air blown per minute is described.

13036* The Problem of Refining With Pure Oxygen. (German.) Otwin Cuscoleca. *Stahl und Eisen*, v. 72, Aug. 14, 1952, p. 989-992.

Discusses the above from the Austrian viewpoint. Presents statistical data for steel production in various countries. Tables and graphs. 10 ref.

13037* Method of Operation and Metallurgical Principles of Steel Refining With Pure Oxygen Blown From the Top. (German.) Herbert Trenkler. *Stahl und Eisen*, v. 72, Aug. 14, 1952, p. 992-997.

Compares above at Donawitz and at Linz using a water-cooled copper tuyere. Gives results of 2-, 5-, and 15-ton melt of this type and a normal basic Bessemer melt. Graphs.

13038* Plants, Operation, and Economic Efficiency of Use of Oxygen in Steelmaking. (German.) Kurt Rösner. *Stahl und Eisen*, v. 72, Aug. 14, 1952, p. 997-1004.

Fundamentals, plants, and equipment. Plan and sectional views of 2 Austrian plants using 25-ton converters. Details of oxygen-production plant. Economic and technical data.

13039* The Present State of the Electrometallurgy of Nonferrous Metals. (German.) Georg Eger. *Zeitschrift für Erzbergbau und Metallhüttenwesen*, v. 5, July 1952, p. 270-276.

Describes the role of electrometallurgy in the production of Cu, noble metals, Pb, Zn, Sn, Mn, Cr, Ca, Ni, Co, Al, and Mg. The problems of basic research and power supply problems are indicated. Diagrams.

Miscellaneous Publications

13040 The Picture Story of Steel. American Iron and Steel Institute, 1952, 56 pages. (Pamphlet file.)

Large-size pamphlet depicting the making of iron; manufacture of steel; production of finished materials, especially by rolling and drawing; and uses of steel. Numerous photographs.

13041 Influence of Calcium Oxide Additions Upon Behavior of Manganese and Silicon in Acid Steel-Making Process. I. A. Popov and B. V. Stark. Henry Brutcher, Translation 2685, 16 pages. (From *Izvestia Akademii Nauk SSSR*, Section of Technical Sciences, Dec. 1950, p. 1806-1814.)

Previously abstracted from original.

13042 Characteristic Behavior of Manganese Carbonate Ores in Blast Furnace. A. L. Zagyanskii. Henry Brutcher, Translation 2719, 5 pages. (From *Doklady Akademii Nauk SSSR*, new ser., v. 76, Feb. 11, 1951, p. 721-722.)

Previously abstracted from original.

2. *Metals—Smelting, Reduction, and Refining*

13043 Manufacture of Steels for Low-Temperature Service. J. B. Austin. National Bureau of Standards, "Mechanical Properties of Metal at Low Temperatures", Circular 520, 1952, p. 36-44; disc., p. 45-47. (HA460 Un3m)

Discusses manufacture of steels that have good notch toughness as indicated by transition from tough to brittle behavior in the Charpy keyhole-notched-bar impact test. Influence of chemical composition, mode of deoxidation, heat treatment, and microstructure, including grain size, are dealt with. No attempt is made to give a complete review of literature in this field. Discussion is confined to certain data that reveals, or confirm, a general trend. 16 ref.

See also:
12996 (briquettes for electric smelting of Fe ores)
13003 (recovery of precious metals)
13361 (deoxidizing and denitriding boron steels)
13366 (improved basic Bessemer steel)
13639 (self-baking electrodes for smelting furnaces)
14228 (smelting and refining of C)
14237 (Fairless Works—U. S. Steel Corp.)

3. FOUNDRY PRACTICE

13044 Foundry Crucible Service Life. R. A. Heindl. *American Foundryman*, v. 22, Sept. 1952, p. 40-43.

Evaluates relative merit of crucibles manufactured from Alabama, Pennsylvania, and Madagascar grahphites. Also covers bonding agents, flake size in crucible mixes, and mechanical properties. Tables and photographs.

13045 Causes of Hot Tears in Steel. *American Foundryman*, v. 22, Sept. 1952, p. 59-62.

Discussion of 7 Texas foundrymen on experiences with the above in steel castings.

13046* Purification of Cupola Fumes. (French.) *Fonderie*, July 1952, p. 3027-3031.

Describes and diagrams principal static and dynamic types of equipment for the above.

13047 Statuary to Electronics Via Plaster Molding. Frank Pfister. *Foundry*, v. 80, Sept. 1952, p. 86-91.

Describes casting in plaster of solid-solution alloys with attention to individual processes. Photographs show phases of molding, and type of castings produced. Gorham Mfg. Co., Providence, R. I.

13048 Sand Reclamation at the Eddystone Plant. Karl S. Howard and Clyde B. Jenni. *Foundry*, v. 80, Sept. 1952, p. 92-95, 272, 274, 276.

Presents methods, advantages, and cost of the above. Photographs, tables, and diagram.

13049 Core Serves as Gate and Riser. Ben F. Sweet. *Foundry*, v. 80, Sept. 1952, p. 96-97, 236.

Above method devised for use in blank gears and sprocket wheels. Explanation and diagrams.

13050 Develops New Process for Casting Stock Bushings. J. Gilbert Hill. *Foundry*, v. 80, Sept. 1952, p. 98-99.

Diagrams and illustrations show new method developed by M. L. Hart, Oklahoma City. The molds are formed in a vertical position and then filled with metal while in a horizontal position. The castings are claimed to be superior in many respects to those made by conventional methods.

13051 Plaster and Plastics Combine in New Pattern Material. Thomas A. Dickinson. *Foundry*, v. 80, Sept. 1952, p. 174, 177, 180.

Above are made by casting and dehydrating least expensive types of plaster, so that the latter can be impregnated with polymerizable-resin solutions. It is then possible to heat-cure casts to be comparable to wood or cast-plastic articles for practical purposes.

13052 Investment Casting. Roy W. Tindula. *Foundry*, v. 80, Sept. 1952, p. 193-194, 196, 198, 201, 204, 207, 208.

Discusses history and present status of investment precision casting or lost-wax process. 73 ref.

13053 Aluminium Matchplate Patterns by the Pressure-Cast Plaster Process. I. American Practice. E. C. Mantle. **II. British Developments.** D. H. Potts. *Foundry Trade Journal*, v. 93, July 31, 1952, p. 117-124; disc., Aug. 7, 1952, p. 157-160.

Descriptions include numerous illustrations.

13054 Role of the Research Foundry Unit. G. A. Lilliequist. *Foundry Trade Journal*, v. 93, Aug. 7, 1952, p. 145-152; Aug. 14, 1952, p. 187-191; disc., Aug. 21, 1952, p. 217-219.

Discusses the above, with emphasis on organization of American Steel Foundries, Inc., East Chicago, Ind. Describes and illustrates laboratory layout. This is followed by details of some specific projects. Diagrams, graphs, and illustrations.

13055 Production of Sound Castings. H. W. Griffiths. *Foundry Trade Journal*, v. 93, Aug. 7, 1952, p. 153-155; disc., p. 155-156.

The main emphasis is on running and feeding methods, which are critically reviewed. The discussion chiefly concerns exothermal material and Connor-block running. Numerous diagrams.

13056 Process Control of Cast Iron for Vitreous Enamelling. *Foundry Trade Journal*, v. 93, Aug. 7, 1952, p. 163-166.

Discussion of paper by J. Bernstein (June 5 and July 10 issues)

13057 Methods Employed in the Production of Heavy Iron Castings. J. Richardson and C. F. Lawson. *Foundry Trade Journal*, v. 93, Aug. 14, 1952, p. 173-179; Aug. 21, 1952, p. 207-215; disc., Aug. 28, 1952, p. 247-248.

A few examples of heavy castings are presented and particular reference made to their main features and problems. Production methods are analyzed and general principles applicable to a variety of castings are formulated. Photographs.

13058 Insulating Feeders for Use With Copper-Alloy Sand Castings. R. A. Skinner and R. W. Ruddle. *Foundry Trade Journal*, v. 93, Aug. 14, 1952, p. 181-184; disc. p. 184-185.

Use of plaster sleeves to decrease the size of feeders and to increase yields was investigated. Diagrams and graphs.

13059 Simple Mechanical Layout for the Jobbing Brass Foundry. F. C. Evans. *Foundry Trade Journal*, v. 93, Aug. 21, 1952, p. 201-203; disc., p. 203-205.

Plant outlined has been operated with great success in a number of American brass foundries. Shows how similar results can be obtained with standard British equipment.

13060 Melting Control by Cupola Pyrometer. R. I. Taylor. *Foundry Trade Journal*, v. 93, Aug. 28, 1952, p. 229-232.

Shows that present methods of cupola control, based on use of volume and pressure meters, leave much to be desired. Gives details of investigation of use of a recording pyrometer for the above. Diagram shows recommended pyrometer location. Typical chart records of temperature are presented and discussed.

13061* Application of the Jet Process for the Repair of Burnouts in Cupolas. (German.) Kurt Krämer and Otto Reinsberg. *Giesserei*, v. 39, July 24, 1952, p. 357-362.

Describes the Torkret process for the above. Types of materials used for the jets, and experiments with various semi-synthetic compounds are indicated. Economic advantages of the method are described. Tables, charts, and diagrams.

13062* A Foundry With Coreless Line-Frequency Induction Crucible-Furnaces for Melting of Magnesium Alloys. (German.) W. Zschintzsch. *Giesserei*, v. 39, Aug. 7, 1952, p. 381-387.

Describes above installation developed in Germany after the war. Construction details are illustrated. Experiences are described.

13063* The Application of Synthetic Sands, Including Cement Sands. (German.) E. Lange. *Giesserei*, v. 39, Aug. 7, 1952, p. 387-390.

Advantages and disadvantages of the use of exclusively synthetic sands in the foundry are investigated. Types of sand, effect of grain size, and water and cement content are indicated.

Examples of practical application are described. Tables and graphs.

13064* New Results With Cement-Sand Casting. (German.) M. Beilhack. *Giesserei*, v. 39, Aug. 21, 1952, p. 405-410.
Reviews various processes for the above. Results with different types of cements, and with different cement and water content are indicated and interpreted. Describes and quotes examples for a new process using fully synthetic, automatically hardening, plastic sand. Graphs and photographs.

13065 Republic Steel: New Titanium Producer. V. W. Whitmer and T. E. Perry. *Iron Age*, v. 170, Aug. 21, 1952, p. 117-122.
Republic Steel is now in commercial production of pure Ti and 2 Ti alloys. They are producing ingots both by arc and induction melting and are marketing the product as bars, strip, plate sheet, and forgings. Their arc-melting furnace is described, diagrammed, and illustrated. Mechanical properties are charted and tabulated. Includes photomicrographs.

13066* Production and Productivity in the American and the Swedish Steel Casting Industries. (Swedish.) Stig Hj:son Ljunggren. *Jernkontorets Annaler*, v. 136, no. 6, 1952, p. 131-155.
On the basis of available statistical data and a visit to a number of steel foundries in the U. S., an attempt is made to analyze the causes of the difference in productivity between the 2 countries. As representative figures for productvity, the author gives for the U. S. 96 and for Sweden 160 manhours per metric ton of steel castings produced. About ⅓ of the difference is explained by more complete mechanization in American steel foundries and by other metallurgical factors. Another ⅓ is due to the facts that a considerable part of American steel castings are produced in large volume and machine molding is therefore widely used. Also the average size of American steel foundries is about 6 times that of Swedish. The last third of the difference is probably mainly explained by higher working intensity in American foundries. 14 ref.

13067 Many Mechanisms at Work Producing Grain Refinement in Light Metals. Harold Bernstein. *Journal of Metals*, v. 4, Sept. 1952, p. 926-930.
Presents the above in view of growth restriction theories, absorption effect, surface tension, nucleation theories, nucleation by foreign particles, and effect of vibration. Tables, graphs, and photographs illustrate results of study of Al, Cu, Ti, Zn 15 ref.

13068* Pressure Die-Casting of Aluminum. (Concluded.) Part VI. Selection of Die Steel. Part VII. Preparation of Die for Foundry. Part VIII. Ancillary Equipment. H. J. Sharp. *Metal Industry*, v. 81, Aug. 8, 1952, p. 109-112; Aug. 15, 1952, p. 123-125.

13069* Remelting Cathode Zinc in Induction Furnaces With Steel Cores. (Russian.) P. F. Sabaneev. *Promyshlennaia Energetika*, v. 9, Jan. 1952, p. 4-7.
Discusses the design and operation of furnaces for melting zinc. Diagrams.

Miscellaneous Publications

13070 Core Baking by High-Frequency Dielectric Heating. J. Meilink. 4th International Mechanical Engineering Congress, June 1952, 19 pages.
Describes above, thermosetting-resin binders being used. Advantages. Influence of variables on core properties. Data on iron castings. Diagrams and graphs.

13071 Development of High-Duty Cast Iron; Austrian Activities. Roland Mitsche and Rolf Weinberger. 4th International Mechanical Congress, June 1952, 7 pages.
Briefly reviews earlier development of above and then summarizes research and development activities of the Austrian High Strength Cast Iron Committee. Diagrams show results of graphite modification by various methods.

Books

13072 Copper-Base Alloys Foundry Practices. Ed. 2. 232 pages. 1952. American Foundrymen's Society, Chicago. (TS650 Am35cb2)
Recommendations in general and for the various types are presented in comprehensive detail. Numerous tables, diagrams, and illustrations.

13073 Symposium on Principles of Gating. 95 pages. 1951. American Foundrymen's Society, Chicago. (TS233 Am35s)
Comprises a preface by R. F. Thomson, subject index, and the following papers: "Fluid Mechanics Applied to Founding", W. O. Wetmore and D. S. Richins; "Tentative Design of Horizontal Gating Systems for Light Alloys", L. W. Eastwood; "Relation of Casting Quality to Gating Practice", W. H. Johnson, H. F. Bishop, and W. S. Pellini; "Considerations in the Feeding of Castings", A. K. Higgins; "Gating Aluminum Castings", T. E. Kramer; "Application of Gating and Risering Studies to Production Castings", J. B. Caine; "Application and Value of Gating Principles Recommended by the A.F.S.-Battelle Film, 'Fluid Flow in Molds' to Steel Castings", J. H. Lowe and J. Austin; "Gating and Risering Tin Bronze Castings", B. N. Ames; "The Why of Gate and Feeder Design", F. G. Sefing; "Gating and Risering of Malleable Iron Castings", E. C. Zirzow; and "Gating and Risering Copper-Base Alloy Castings", W. W. Edens.

See also:
13504 (casting of Cu alloys)
13587 (development of gray cast iron)
13728 (dimensional photoelasticity)

4. METALS—PRIMARY WORKING

13074* Friction Caused by Roll Pressure Corresponding to Various Elasticity Moduli. (German.) Alfred Shafer. *Archif für das Eisenhuttenwesen*, v. 23, July-Aug. 1952, p. 253-256.
Proposes mathematical calculation of the above for the boundary case of complete adhesion, and for case of medium adhesion range, and for the final stages of creep. Theoretical results are verified by photoelastic experiments. Graphs.

13075* Calculating Aids in Wire Drawing. Karl Schimz. *Draht* (Wire) (English Ed.), July 1952, p. 31-35.
Gives details of the above. Numerical examples and nomograms.

13076 Strip Rolled to 0.0002 In. on New Small Mill. Robert L. Stockus. *Iron Age*, v. 170, Sept. 4, 1952, p. 156-159.
Describes new and unique rolling mill developed by the Armzen Co., Waterbury, Conn., which will cold-roll electrical alloys to 0.0002 in.

13077 Strip and Wire Drawing; A Simple Account of Modern Theory. J. G. Wistreich. *Iron & Steel*, v. 25, Sept. 1952, p. 391-395.
Outlines some features of modern plasticity theory covering such topics as: work hardening and equivalent mean strain; effect of friction, strip-drawing theory; and wire-drawing theory. Graphs.

13078 The Rendleman Rod Mill. Norman Rendleman and A. Wilson. *Iron and Steel Engineer*, v. 29, Aug. 1952, p. 77-83; disc., p. 83.
Rod mill described is essentially a 3-strand mill with 3 lines employed to roll 400, 500, or 600 lb. billets into any size of rod. In operation, the mill approaches the equilavent of 3 single-strand mills. The fundamental components are organized in a new and highly advantageous way. Details are illustrated diagrammatically.

13079* Research on Back-Tension Wire Drawing. (Japanese.) Hiromu Suzuki. *Report of the Institute of Industrial Science, University of Tokyo*, v. 1, no. 30, Dec. 1950, p. 73-118.
Rheological characteristics of deformation caused by drawing, mechanical properties of drawn wires, and mechanical characteristics of wire-drawing machines were studied. Numerous graphs and diagrams.

13080* Rolling Program and Rolling Diameter in Cold Rolling of Brass Strip and Plate. Part I. (German.) Karl-Heinz Lucas and Otto Emicke. *Metall*, v. 6, Aug. 1952, p. 417-426.
Describes continuous cold-rolling processes. Advantages of modern methods are outlined. Tables and graphs.

4. *Metals—Primary Working*

13081 Drop-Forging Practice in Australia. H. J. Merchant. *Metal Treatment and Drop Forging*, v. 19, Aug. 1952, p. 335-341.

Survey of the progress made with regard to the above, plus a description of drop-forging facilities and practices of Australian Forge and Engr. Pty., Ltd., Sydney, N. S. W. (To be continued.)

13082* Impact Forging Strong Aluminum Alloys. R. A. Quadt. *Modern Metals*, v. 8, Aug. 1952, p. 43-44.

Describes new process called cold-impact forging now employed at Riverside, Calif., plant of Hunter Douglas Corp.

13083 High-Geared Production With Induction Heating. *Steel*, v. 131, Sept. 8, 1952, p. 88-92.

Tells how increased output in forging of transmission gears is achieved by conversion to induction heating at Chevrolet Saginaw Transmission Div. Photographs.

13084 Wide Strip Mill Opens World of New Ideas. Frank H. Fanning. *Steel*, v. 131, Sept. 8, 1952, p. 100, 102, 104.

See abstract of "Wide Strip Mills—Evolution or Revolution?" *Blast Furnace and Steel Plant*, v. 40, Aug. 1952, p. 913-920.

Book

13085 Steel Wire in America. Kenneth B. Lewis. 351 pages. 1952. The Wire Association, Stamford, Conn. (TS270 L58s)

A record of the changes the authors have seen in wiremaking techniques through the past half century and some earlier lore. Includes chapters on pickling and inhibitors, thermal treatment, waste-acid disposal, plastic flow and stress theories, galvanizing, and uses, as well as on wire-drawing processes.

See also:
13123 (rolling of metal powders into strip)
13159 (bonderizing for ferrous wire drawings)
13181 (weld deposition for reclamation of forging dies)
13285 (theory and practice of metalworking)
13295 (cold-working for softening of metals)
13371 (forging of turbine rotors)

5. METALS—SECONDARY WORKING

13086 Soft Steel and Ultrasonics Machine Carbide. George H. DeGroat. *American Machinist*, v. 96, Sept. 15, 1952, p. 141-144

Tells how, hard and brittle metals, as well as nonmetals, are quickly and easily machined using the ultrasonic process. Soft tools, with boron carbide as an abrasive, drill and thread holes, produce complex cavities and recesses of any depth and shape in carbides, hardened tool-steel, ceramics, glass, and other materials, conducting and nonconducting alike.

13087 Make Research Data Useful to the Shop Man. Max Kronenberg. *American Machinist*, v. 96, Sept. 15, 1952, p. 145-150.

Deals with productivity in metal-cutting operations. Presents and discusses use of available charts for SAE-1035 steel and for brass. Their use is illustrated by numerical examples. Points out need for similar research to be done on many other materials.

13088 Cartridge Cases are Drawn From Hot-Forged Cups. George H. DeGroat. *American Machinist*, v. 96, Sept. 15, 1952, p. 151-152.

Describes and diagrams above operation as applied by Frankford Arsenal to production of 75-mm. cases from SAE-1030 hot-rolled steel bar stock. Only 3 basic operations are required —sawing bar stock, heating bars, and forging. Cites important advantages.

13089 Labor is the Big Factor in Friction-Sawing Costs. *American Machinist*, v. 96, Sept. 15, 1952, p. 153.

A recent item described use of ordinary box strapping as a toothless band-blade for friction sawing stainless steels and other ferrous alloys. However, although box strapping costs only 3 cents per shift as compared with $12 per shift for regular saw blades, labor costs make actual costs 4-6 times higher for the makeshift material.

13090* Cold-Rolled Fillets. R. J. Love. *Engineering*, v. 174, Aug. 8, 1952, p. 164.

Describes a process devised for strengthening fillets, consisting of cold-rolling with steel balls, which has given striking results. It was used on cast crankshafts of flake-graphite iron. Fatigue-test results show that, under reversed bending cold-rolling increased the limiting stress of crankshafts by 60% and that under "one-way" loading, the increase of strength was as much as 80%. Graphs and diagrams.

13091* Soviet Machine Tools. J. Mannin. *Engineers' Digest*, v. 13, Aug. 1952, p. 253-256.

Includes brief review of history of machine tools in Russia, equipment produced in Russia, features and design, description of technical advancement in techniques and mechanical equipment, and statistical review of production and use of machine tools and allied equipment. (To be continued.)

13092 Band-Sawing Nonferrous Castings. H. J. Chamberland. *Foundry*, v. 80, Sept. 1952, p. 112-113, 220.

Discusses types of saws and rates of cutting for castings of Al, Mg, and Cu. Photographs.

13093* Machining Tungsten Carbide With Diamond Tools. G. B. Dauncey and R. S. Young. *Industrial Diamond Review*, new ser., v. 12, Aug. 1952, p. 161-164.

Discusses turning and boring sintered carbide using a production model lathe with shaped and polished diamond tipped lathe tools. Illustrations and diagrams.

13094 Abrasive Belts Taper Aluminum Plate. *Iron Age*, v. 170, Aug. 21, 1952, p. 130-131.

Equipment for putting the taper and finish on Al plate for aircraft wings. It can remove as much as 0.01 in. of stock in one pass, over entire width of plates 72 in. wide. Roughing and finishing can be done in same machine. Advantages are cited.

13095 Hot Cupping, Cold Drawing Replace Machining Operations. G. F. Burnley. *Iron Age*, v. 170, Sept. 4, 1952, p. 152-153.

Describes savings in critical alloy steel and elimination of costly machining operations resulted from use of above operations to make 81-mm. shells from SAE-1010 steel billets at Rheem Mfg. Co., Richmond, Calif. Billets are induction heated at 2000°F. and hot forged in a 600-ton Ajax forging press.

13096 Radioactive Tools Permit Fast Tool Wear Studies. M. E. Merchant, Hans Ernst, and E. J. Krabacher. *Iron Age*, v. 170, Sept. 4, 1952, p. 154-155.

Describes new method for speeding up machinability studies and other tests depending on measurement of tool wear by making use of above.

13097* More Production Through Better Understanding of Machinability. K. R. Blake. *Modern Machine Shop*, v. 25, Sept. 1952, p. 158-160, 162, 164, 166, 168, 170, 172, 174, 176, 178, 180, 182-183, 186.

Extensive report of above in reference to velocity and area of contact, effect of tool shape, mechanism of failure in tool life, high-speed-steel tools, carbide tools, effect of cutting fluids, and work-tool thermocouple tests. Diagrams.

13098 Cutting Fluids for Machine Tools. C. M. Larson. *Petroleum Engineer*, v. 24, Sept. 1952, p. C5-C8, C10, C13-C14, C16, C18.

An extensive discussion of the above which includes cooling, wetting properties, lubrication, chip removal, types of fluids, cutting oils, and cutting fluid ingredients. Cutting fluid recommendations for high-speed steel, cobalt alloy, and cemented carbide tools. Photographs and tables.

13099* An Automatic Machine Tool. William Pease. *Scientific American*, v. 187, Sept. 1952, p. 101-110, 112, 114-115.

Presents first account of a milling machine that converts information on punched tape into the contours of a finished part. Photographs and diagrams.

13100 Titanium: It Can Be Formed and Drawn. Carter C. Higgins. *Steel*, v. 131, Sept. 8, 1952, p. 92-93.

Brief discussion of above.

13101* Internal Kinetics of Ball Mills. Impact Forces in Ball-Mill Grinding. (German.) R. Liebold. *Technik*, v. 7, Mar. 1952, p. 113-118.

Mathematical method of computing above is developed. Diagrams.

13102* New Rod Converts Welding Machine Into Cutting Tool. Arthur L. Phillips. *World Oil*, v. 135, Aug. 1952, p. 260, 262.

Tells how 2 new flux-coated electrodes enable a welder to use his welding machine for cutting and burning all kinds of metals —even cast iron. Heat generated by the welding machine is concentrated in a small area by the flux on the rod. At the same time the flux generates a gas shield which prevents oxidation of the cut.

Miscellaneous Publications

13103 Correlation of Machinability With Inclusion Characteristics in Resulphurized Bessemer Steels. Lawrence H. Van Vlack. American Society for Metals, Preprint 16, 1952, 13 pages. (TS300 Am35p)

Some of the factors affecting shapes and sizes of inclusions in rolled resulfurized steels are examined. These inclusion characteristics are governed by Si and S contents of the steel, mechanical working which the steel receives, and possibly by O_2 content of the sulfide phase. These characteristics, in turn, influence machinability of the steels when other metallurgical factors are equal.

13104 The Influence of Insoluble Phases on the Machinability of Titanium. R. M. Goldhoff, H. L. Shaw, C. M. Craighead, and R. I. Jaffee. American Society for Metals, Preprint 30, 1952, 25 pages. (TS300 Am35p)

Machinability of Ti is shown to be very sensitive to strength level and to machining conditions. It doubles when purity is increased from that of the commercial Mg-reduced grade to that of the high-purity iodide Ti. Similarly, when the tool-thrust load is increased or speed of cutting is decreased, machinability increases relative to free-cutting steel much more than does, say, 18-8 stainless steel. In an attempt to improve the machinability of Ti, alloy additions that formed insoluble phases with Ti were investigated. Some, like B, As, Te, S, and Se, made a moderate improvement in machinability when added in suitable amounts. Others, particularly carbon, were very detrimental to machinability.

13105 About Origination and Prevention of Flow Lines at the Drawing Process of Brass and Nickel Silver Hollow Ware. R. Ergang. 4th International Mechanical Engineering Congress, June 1952, 10 pages.

A study of above. Includes discussion of flow-lines in steel, iron, and brass; survey of tension-dilation-curves of brass and nickel silver with simultaneous, subjective observation of stretcher-strains; and influence of various heat treatments, grain size, testing velocity, and resting at room temperature. Graphs and photographs.

13106 The Stamping Property of Steel Material. E. M. H. Lips, W. de Vos, and H. v. Zuilen. 4th International Mechanical Engineering Congress, June 1952, 7 pages.

Discusses the life of a stamping tool in relation to quality of stamped material. Describes method for testing quality and gives experimental data for stampings made from phosphor bronze and from silicon iron. Theory. Tables and diagrams.

13107 Fundamentals of the Effect of Temperature and Abrasion in Machining, Especially of Creep Resisting and Stainless Steels. (German.) H. Opitz. 4th International Mechanical Engineering Congress, June 1952, 8 pages.

Discusses the processes involved in continuous formation of shavings from point of view of plasticity mechanics. Proposes a method for the calculation of temperature accompanying shearing process. The special problems of C steels and austenitic steels are indicated. Graphs and diagrams.

13108 Testing of the Cutting Property of Materials for Mass Production. P. Wiest. 4th International Mechanical Engineering Congress, June 1952, 11 pages.

Discusses machinability tests and describes a new quick method in which the material to be tested is machined by longitudinal turning with cutting speed increased in stages by permanent amounts from a certain initial speed up to failure of the cutting edge. Tabular data on machinability of carbon and alloy steels using 5% tungsten steel tools and high-speed tools. Derived relative machinability indexes for these steels (including American types). Diagrams, graphs, and photomicrographs.

See also:
13134 (drawing, working, and machining of Cr-Fe alloys)
13154 (residual stresses in Mn tool steel)
13283 (shot peening of steel drill rods)
13285 (theory and practice of metalworking)
13319 (workability of converter steel refined with O_2)
13367 (effect of Si in Al on cutting-tool life)
13507 (roughness studies on mechanical metal surfaces)
13561 (making nuts, bolts, and screws)
13572 (tool steels—uses and types)
13727 (safety guards for pressworking equipment)
13947 (metalworking in automotive industry)

6. POWDER METALLURGY

13109 Ingenious Tools Make Complex Metal-Powder Parts. *American Machinist*, v. 96, Sept. 1, 1952, p. 105-109.

Describes pressing tools for above parts, and sizing equipment for holding close tolerances. Diagrams and photographs show typical pieces produced by Michigan Powdered Metal Products Co., Northville, Mich.

13110* Effect of Particle Size on Certain Properties of Sintered-Iron Products. (Portuguese.) Carlos de Revorêdo Barros. *Boletim da Assoçiacäo Brasileira de Metais*, v. 8, Jan. 1952, p. 32-47.

The necessity of checking the raw material used in powder-metallurgy industry was investigated, in order to obtain uniformity of the final product. Influence of particle size on certain physical properties of sponge and electrolytic Fe powder was investigated. Table, graphs, and photomicrographs.

13111* Some Porous Materials Obtained by Sintering Without Pressure. (French.) Maurice Claude. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences*, v. 235, July 16, 1952, p. 172.

By using welding fluxes such as borax, and operating under atmospheric pressure, at temperatures higher than the melting point of the material being tested, it was possible to obtain sintered metal bodies of desired porosity for different applications.

13112 A High Temperature Sintering Furnace. J. H. Rendall. *Journal of Scientific Instruments*, v. 29, Aug. 1952, p. 248-250.

Describes a laboratory furnace which can heat refractory metals very efficiently. The furnace can be heated to or cooled from high temperature in less than 10 min. and the specimen can be lowered into or raised from the hot zone while the furnace is at temperature. As the furnace contains no refractory materials to absorb heat, it rapidly attains the equilibrium temperature corresponding to a particular power input. Diagrams.

13113 Sintered Aluminum Powder: The Development of SAP. *Metal Industry*, v. 81, Aug. 22, 1952, p. 143-146.

Points out advantages of above German development, giving tabulated information on physical and mechanical properties of the powder and of the sintered products.

13114* Powder-Metallurgical Production of Semi-Finished Products From Nonferrous Metals. (German.) H. Franssen. *Metall*, v. 6, Aug. 1952, p. 444-446.

Describes various processes for the above; advantages of the nonferrous metals over Fe for many purposes are outlined.

13115* "S.A.P.", a New Material Made From Aluminum Powder Sintered Hot. (French.) A. von Zeerleder. *Metaux: Corrosion—Industries*, v. 27, June 1952, p. 274-277.

SAP (sintered aluminum powder) is described in detail, with

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emphasis on fabrication, applications, and mechanical properties, the latter being compared with those of "Alloy Y", Avional, and pure Al. Graphs and tables.

13116* Grain Formation in Hard Metal Alloys. Walther Dawihl. *Microtechnic* (English Ed.), v. 6, Sept. 1952, p. 165-173. (Translated from the German.)

Deals with occurrence and influence of intermediate layers on grain formation in sintered alloys of WC in combination with Co, and with Ni. 11 ref.

13117* Trends in the Design and Use of Sintered-Iron Friction Bearings. (German.) Werner Schroeder. *Technik*, v. 3, Apr. 1952, p. 181-188.

Discusses production and properties of sintered iron, also production machining, designing, operating conditions, lubrications, tolerances, and possible uses of above bearings. Diagrams, tables, and graphs. 19 ref.

Miscellaneous Publications

13118 Investigations of Processes of Pressing and Sintering of Metal Powders by Method of Electrical Conductivity. V. I. Likhtman and L. T. Nazarov. Henry Brutcher, Translation 2789, 8 pages. (From *Doklady Akademii Nauk SSSR*, new ser., v. 78, June 1, 1951, p. 749-752.)

Previously abstracted from original.

13119 Pressure Conditions in Metal Powders During Pressing Procedure. C. Ballhausen. 4th International Mechanical Engineering Congress, June 1952, 12 pages.

Claim tests prove that a far-reaching principle conformity exists between the behavior of a metallic powder being pressed in a mold and the behavior of a rope moving on a pulley, except that in one case pressure and in the other case tension must be applied. Experimental data on Pb, Cu, Fe, and steel. Diagrams, photographs, and graphs.

13120 Activity of Finely Grained Powder and Its Influence on the Sintering Process. (German.) J. Hinnüber and O. Rüdiger. 4th International Mechanical Engineering Congress, June 1952, 22 pages.

Tells how the above can be measured by a number of methods. Shows that sintering process and properties of sintered products depend on condition of the powder used. These observations are illustrated by means of measurements made with 4 different tungsten powders. Mechanical properties of hard-metal alloys. Electron-microscope data on primary particles and recrystallized grains in tungsten carbide-cobalt-alloys. Graphs, tables, photographs, and micrographs. 15 ref.

13121 The Particular Situation of Powder Metallurgy in the Manufacture of Permanent Magnets. (German.) Werner Hotop. 4th International Mechanical Engineering Congress, June 1952, 25 pages.

Advantages, limitations, fields of application, and comparison with cast materials. Data on magnetic properties. Tables and graphs.

13122 The Application of Sintered Iron and Steel Parts in the Mechanical Industry. S. I. Hulthen. 4th International Mechanical Engineering Congress, June 1952, 12 pages.

Discusses above, dealing with powder production and economics; advantages and disadvantages of powder metallurgy as a production method; chief steps in the process; and application and economy.

13123 Rolling of Metal Powders. (German.) Gerhard Naeser. 4th International Mechanical Engineering Congress, June 1952, 14 pages.

Introduction of metal powders into the gap of rolls arranged adjacent to each other results in an endless strip which by repeated short sintering and cold and hot rolling will attain the properties of strip as made by the usual process. The investigation comprised: effect of rolling factors on density and strength of the compressed strip; determination of sintering times and of change occurring in strength with the number of cold-rolling passes; and manufacture of Fe, Cu, and brass strips and determination of their characteristics. Diagrams, graphs, and tables.

See also:
13243 (diffusion in relation to sintering)
13373 (production of sintered parts)
13571 (powder metallurgy parts in high-temperature applications)
13673 (sintering of Zr carbide-Cb cermet)
13679 (metal-ceramic composites)
13724 (manufacture of sintered friction materials)

7. METALS—WELDING OR JOINING

13124 Flash Welding of Titanium Alloys. I. A. Oehler. *Automotive Industries*, v. 107, Aug. 15, 1952, p. 39, 154, 156. See abstract of "Titanium Alloys Flash Welded Easily." *Steel*, v. 131, July 14, 1952, p. 84-85.

13125 New Welding Process Developed for Joining Small Aluminum Wires. P. B. Dickerson and C. R. Dixon. *Automotive Industries*, v. 107, Sept. 1, 1952, p. 50-51, 100, 102.

Points out that welded joints are easy to make with simplified equipment, and have excellent corrosion resistance. Al was welded experimentally to brass, nichrome, chromel, alumel, W, steel, Fe, and constantan.

13126* Basic Electrodes. (Spanish.) Salvador Ma. Checa Casajús. *Ciencia y Técnica de la Soldadura*, v. 2, Mar.-Apr. 1952, 8 pages.

Advantages and disadvantages of basic coated electrodes are discussed. Compares the mechanical and penetration characteristics of basic electrodes with other kinds of electrodes, stressing the great advantages of the former and their future possibilities. Includes photographs and tables. 17 ref.

13127* Completely Welded Ship Hulls. Practical Consequences of the Results Obtained During Their Construction and Maintenance. Part II. (Spanish.) Erich Vollbrecht. *Ciencia y Técnica de la Soldadura*, v. 2, Mar.-Apr. 1952, 9 pages.

Describes order and sequence of construction, as well as difficulties encountered and their solution. Also describes correction of deformations and relief of welding stresses.

13128* Sequence and Continuity Mark Modern Welding Practice. R. W. Binder. *Civil Engineering*, v. 22, Sept. 1952, p. 186-191.

Illustrated discussion of above as used in the Division Street Interchange, San Francisco.

13129* Study Using the Crossed-Gradient Method of the Behavior of Steel During Welding. (French.) Henri Granjon. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences*, v. 235, July 16, 1952, p. 173-175.

Explains above method of studying general metallographic problems when it is necessary to associate 3 variables: duration of heating, maximum temperature, and rate of cooling.

13130* Welding Mechanism of Resistance Welding and Determination of Welding Procedures. (Japanese.) Zenzaburo Sawai. *Report of the Institute of Industrial Science, University of Tokyo*, v. 1, no. 7, Mar. 1951, p. 208-238.

Electrical, thermal, and mechanical problems of resistance welding, such as heating due to contact resistance, effect of mechanical pressure, and cooling by surrounding metals and electrodes, are discussed from an experimental and theoretical standpoint; a method of determining welding procedure is considered based on the above discussion; and it is demonstrated also that the slope control of welding current is very effective in some cases. Numerous graphs and diagrams. 25 ref.

13131 Automatic Welding. J. Latimer. *Transactions of the Institute of Welding*, v. 15, June 1952, p. 71-82; disc., p. 82-85.

Describes the principal types of automatic welding machines now in use, comparing their relative merits and drawbacks, and from a detailed examination of certain applications to which hand welding might appear to have an advantage, concludes that length of run, size of joint, speed of actual welding, and economy of electrodes are not the only important factors favoring more extensive use of automatic welding.

13132 Preheat Temperatures for Welding Metals and Alloys. *Materials & Methods*, v. 36, Aug. 1952, p. 131.

Tabular presentation confined to the various types of steel.

13133 Ultrasonic Soldering. E. A. Neppiras. *Metal Industry*, v. 81, Aug. 8, 1952, p. 103-106.

Describes a practical method of soft soldering Al and its alloys. Discusses its advantages and limitations. 16 ref.

13134 Welding and Brazing. *Metal Progress*, v. 62, Sept. 1952, p. 101-104.

Series of brief articles as follows: "Three Factors Affect Weldability of Chromium-Iron Alloys", M. C. T. Bystram and W. I. Pumphrey; "Fabrication Techniques for Type 430 Stainless", M. E. Carruthers; "Deep Drawing Techniques for Reduced Fabricating Costs", E. Von Hambach. Table on compositions and fabrication (hot and cold working, machining, and welding) of wrought Cr-Fe alloys is included.

13135 Welded and Seamless Tubing—Properties and Applications. *Metal Progress*, v. 62, Sept. 1952, p. 110-112.

Series of brief articles as follows: "Some Rules for Using Tubular Products of 400 Series", H. D. Newell; "Type 430 Welded Tubing, Stabilized With Titanium", V. W. Whitmer and J. S. Adelson; "High-Temperature Properties of Ferritic Stainless Tubing", A. B. Wilder; and "Applications for Straight Chromium Stainless Tubing", J. A. Deitrich.

13136* Calculation and Construction of Welded Structures. Influence of Size and Strength in Resistance Spot Welding. (German.) W. Glage. *Schweissen und Schneiden*, v. 4, Aug. 1952, p. 292-297.

Proposes a method of calculation for the above on the basis of data from the literature. Examples are indicated. Data are tabulated and charted.

13137* Characterization of Coated Electrodes. (German.) Werner Hummitzsch. *Schweisstechnik*, v. 6, May 1952, p. 49-57.

Evaluates different types of electrodes, and their performance. Describes in particular the craters of various coated electrodes, transfer of droplets in the electric arc, electrical resistance of electrode coatings and electrical conductivity of their hot slags, viscosity and surface tension of the slags, and form and structure of the weldments. Diagrams and photographs.

13138 Hot "Sandwich" of Copper and Stainless. *Welding Engineer*, v. 37, Sept. 1952, p. 42-43.

Presents ways in which "Rosslyn Metal" can be welded with reference to spot and seam, and arc welding. Refers to strength at high temperature. Photographs.

13139 Correlation of Weldability Tests With Structural Joints. Part II. Investigations With Unrestrained Fillet Tests and Structural Joints. C. L. M. Cottrell and M. D. Jackson. *Welding Research*, v. 6, Apr. 1952, p. 31r-42r.

Relative effects of joint rigidity and rate of cooling on initiation of hard-zone cracking were studied in an attempt to resolve the two effects,. and to provide a scientific basis for correlation of weldability tests and structural joints. Effect of potential hydrogen content in the electrode coating on incidence of hard-zone cracking was also studied. Low-alloy Mn-Mo steels were used in the tests. Results are tabulated, charted, and illustrated.

13140 Weld Hardenability of Chromium-Molybdenum Steel Pipe. *Welding Research*, v. 6, Apr. 1952, p. 43r-46r.

Metal-arc welded samples of 1%-Cr, 0.5%-Mo steel pipe differing in wall thickness were provided by 3 different firms, using various sizes of electrode and preheating temperature. The lowest hardness in the heat-affected zone was associated with the highest temperature of preheat (300°C.); and the results obtained indicate that a preheating temperature of not less than 200°C. should be used when welding these steels.

See also:

13142 (annealing effects on steel arc welds)
13319 (weldability of converter steel refined with O_2)
13320 (weldability of test steels)
13369 (improved weldable structural steels)
13949 (ethoxyline resins as metal bonding agents)

8. METALS—THERMAL TREATMENT

13141 Toolroom Heat-Treating Equipment. *American Machinist*, v. 96, Sept. 15, 1952, p. 169, 171, 173.

A condensed description of various types. Includes rating chart for toolroom furnaces.

13142* Influence of Annealing and of Nitrogen on Properties of Electric-Arc Welds. (German.) Fr. Gentner. *Brennstoff-Wärme-Kraft*, v. 4, Aug. 1952, p. 275-279.

Describes the above in boiler construction. Compares the properties of un-annealed welds with those annealed without stresses and with air-quenched welds. Proposes an explanation for the differences noted. Results are discussed.

13143* What Temper is Best for Insulated Aluminum Conductors? Joel Tompkins. *Electrical World*, v. 138, Sept. 8, 1952, p. 120-122.

Heat-cycle tests at Electrical Conductor Laboratory of Aluminum Co. of America show advantages of intermediate temper for best overall "connectibility" characteristics for insulated Al wire and cable.

13144* A Furnace for the Stabilization of Castings. (French.) Georges Ulmer. *Fonderie*, July 1952, p. 2999-3006.

Describes furnace used for stress-relief annealing of castings. Dimensions, construction, and operation are indicated. Results of experiment are outlined. Photographs.

13145 Equipment for the Thermal Treatment of Non-Ferrous Metals and Alloys. *Journal of the Institute of Metals*, v. 80, Aug. 1952, p. 667-681.

Joint discussion of 7 papers published in v. 80, p. 255-339.

13146 Annealing for Narrow Strip Mills. J. L. Whitten. *Iron and Steel Engineer*, v. 29, Aug. 1952, p. 84-90; dis., p. 90-91.

Shows how extensively the narrow strip industry has adopted the most modern conception of annealing design in single-stack furnaces with high convection gas-circulating systems, high heat inputs, alloy inner covers, and oil-sealed bases. Diagrams and illustrations.

13147 One Way to Increase Heat Treating Furnace Efficiency. Frank Panlener. *Materials & Methods*, v. 36, Aug. 1952, p. 106-107.

Tells how, by redesign of fixtures, Heat Treating Dept., Nash Motors Div., Nash-Kelvinator Corp., reduced dead weight and increased effective capacity of their furnace without overloading it.

13148* Structure and Hardenability of Copper-Manganese-Silicon Alloys. (German.) K. L. Dreyer. *Metall*, v. 6, Aug. 1952, p. 440-444.

Diagrams and discusses the behavior of Cu-Mn-Si alloys on the basis of the literature. Reports on experiments with alloys containing 1 and 2% Mn, and 2-5% Si. Results are interpreted.

13149 What Price Hardenability? Harry M. McQuaid. *Metal Progress*, v. 62, Sept. 1952, p. 88-96.

Considers various types of alloy steel with respect to hardenability, and application in automotive parts. Discusses advantages of Cr-V steels, use of straight-Cr steel, economic criteria for use of Cr and Mn, and increased use of Mo in alloy steels.

Miscellaneous Publications

13150 Mechanism of the Carburization of Some Stainless Steels. J. B. Giacobbe. American Society for Metals, Preprint 3, 1952, 15 pages. (TS300 Am35p)

A theory of carburization of alloy steels postulates that pure, solid carbon cannot supply soluble or diffusible carbon to the metal surface. An "oxidizing potential" created by CO_2 or water vapor must exist in order that nascent carbon may be generated as a result of the formation and subsequent dissociation of CO. It is shown that certain 18-8 austenitic stainless steels can absorb carbon from high-purity graphite under a vacuum of the order of 10^{-4} mm Hg. Under these conditions, it is believed that the gaseous phase or "oxidizing potential" plays a minor role in the mechanism of carburization. On the other hand, contact pressure between the solid carburizer and the metal

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surface exerts a pronounced influence on rate of carburization, the higher the pressure, the greater the C absorption. This is explained on the basis of "contact catalysis."

13151 The Effect of Silicon on the Tempering of Martensite. A. G. Allten and P. Payson. American Society for Metals, Preprint 10, 1952, 28 pages. (TS300 Am35p)

Evidence is presented that Si affects hardness during tempering of 0.6% C and 0.4% C + 3% Ni steels which contained up to 2.2% Si. Hardness, dilatometric, specific volume, electrical resistivity, and X-ray diffraction measurements were used. Results demonstrate that the temperature at which cementite forms, on heating of martensite at a definite rate, is raised in relation to Si content. Notch-impact properties of the tempered steels were affected by the presence of Si. 13 ref.

13152 The Mechanism and Kinetics of the First Stage of Tempering. C. S. Roberts, B. L. Averbach, and Morris Cohen. American Society for Metals, Preprint 11, 1952, 24 pages. (TS300 Am35p)

Above were studied by means of X-ray and length measurements on a series of high purity Fe-C alloys and commercial steels. In particular, a single-crystal X-ray technique was employed to ascertain changes in the martensitic matrix attending rejection of carbon. Kinetics of the retained austenite transformation in the 2nd stage of tempering are reported in an appendix.

13153 An End-Quench Test for Determining the Hardenability of Carburized Steels. F. X. Kayser, R. F. Thomson, and A. L. Boegehold. American Society for Metals, Preprint 13, 1952, 17 pages. (TS300 Am35p)

Describes a new type of end-quench bar developed specifically for measuring the hardenability of case-treated steels. This bar, called the trapezoidal bar, was designed such that hardness impressions can be made at any point in the case or in the core over the entire quenched length of the bar without the necessity of grinding. Hardness impressions are made perpendicular to the concentration gradient, and hardenability results are directly comparable to those obtained by using a standard Jominy bar. Data are presented from experimental work in measuring hardenability of grades of carburizing steels. They indicate that case hardenability of boron steels goes through a maximum at about 0.70% C.

13153a The Influence of Boron on Case Hardenability in Alloy Carburizing Steels. C. F. Jatczak and E. S. Rowland. American Society for Metals, Preprint 14, 1952, 13 pages. (TS300 Am35p)

The carburized end-quenched test was used to evaluate the effect of boron on case hardenability of 80B20, 94V20, 94B20, and 47B20 containing 0.60-1.0% C for several heat-treating conditions.

13154 The Effect of Quenching and Tempering on Residual Stresses in Manganese Oil Hardening Tool Steel. Harold Jack Snyder. American Society for Metals, Preprint 21, 1952, 12 pages. (TS300 Am35p)

The data presented indicate that the principal quenching stresses in a fully hardened flat specimen are tensile, equal in all surface directions, and concentrated within a surface layer 0.025 in. in thickness. A tempering treatment progressively decreases these surface stresses until they become negligible or slightly compressive, but does not affect depth of penetration. Effects of etching, lapping, and grinding on residual stresses in the same steel were also investigated. 17 ref.

13155 The Effect of Various Heat Treating Cycles Upon Temper Brittleness. L. D. Jaffe, D. C. Buffum, and F. L. Carr. American Society for Metals, Preprint 25, 1952, 7 pages. (TS300 Am35p)

Material from one heat of SAE-3140 steel was quenched and tempered. Portions were subjected to 20 different temper-embrittlement cycles involving slow and rapid heating and cooling, with and without isothermal holding at one temperature. Temperature of transition from tough to brittle fracture in the V-notch Charpy test was determined after each treatment.

13156 Improvements and Saving of Steels in Quench-Hardening. (French.) Manlio Pesante. 4th International Mechanical Engineering Congress, June 1952, 23 pages.

Considers the quenching phenomenon; its effect on steel structural changes; and the so-called cooling power of quenching baths. Reviews conditions to be fulfilled by the bath. Describes an instrument which automatically records the quenching curve while quenching progresses. Graph characterizes cooling power of the bath.

See also:
13140 (weld hardenability of Cr-Mo steel pipe)
13224 (nitriding Fe-Ni alloys)
13277 (aging of high-strength Al alloys)
13296 (post-weld solution treatment of austenitic stainless)
13321 (hardening of ingot iron at subzero temperature)
13332 (tempering of 18-4-1 high-speed steel)
13399 (heat treatment of Cr-steel welds)
13510 (hardenability testing of toolsteels)
13573 (hardenability of automotive steels)
13575 (heat treatment of Cr-Fe alloys)

9. CLEANING, FINISHING, AND COATINGS—METALLIC

13157* The Use of Barium Peroxide for Extending the Life of a Nickel Bath. Jason M. Zander. *Better Enameling*, v. 23, Aug. 1952, p. 6-7, 32.

A typical example of the over-all shop results obtained with respect to daily changes in pH and ferrous sulfate content affected by barium peroxide additions is shown in a table. Results cover a period of 2 mos. continuous operation, during which time approximately 450,000 sq. ft. of ware were processed in an 1800-gal. tank.

13158* Ways and Means for the Economical Use of Zinc During Hot Dip Galvanizing. Hans Rueckemesser. *Draht* (Wire) (English Ed.), July 1952, p. 38-40.

Brief evaluation of pros and cons of various processes for the above.

13159* The Application of Bonderizing to Steel and Iron Wire Drawing. *Draht* (Wire) (English Ed.), July 1952, p. 40-42.

General discussion on above regarding saving of dies, increase of drawing speed, and other advantages where this method is employed.

13160* The Control of Pickling Baths by Measuring the Electric Conductivity of the Pickling Liquid. Rudolf Bruehl. *Draht* (Wire) (English Ed.), July 1952, p. 52-53.

Presents experimental data on measurement of free acid on the basis of conductivity of the pickling liquid.

13161 The Electrodeposition of Silver on an Iron-Nickel Alloy for a Glass-to-Metal Seal Arrangement. R. T. Foley, R. D. Alvord, and J. K. Easley. *Journal of the Electrochemical Society*, v. 99, Sept. 1952, p. 349-353.

Describes a method of Ag plating a 58% Fe-42% Ni alloy to produce an electrodeposit capable of withstanding annealing at 850°C. Surface preparation of the alloy, proper salt concentration of the "strike" bath, and the plating step are also described. Photomicrographs.

13162* Anodic Oxidation and Colouring of Aluminum. Bernard C. Lewsey. *Electroplating and Metal Finishing*, v. 5, Aug. 1952, p. 250-253.

Aluminum anodized in chromic acid electrolyte by a modification of the Bengough process can be satisfactorily dyed to both pastel and deep colors and to black. In comparison with the finish produced by the normal H_2SO_4 process, the chromic acid finish appears much more solid and more closely resembles enamel or high-gloss paint. Describes experiences with this process on a production basis.

13163* Testing of Corrosion-Protective Wrappings by Electric Measurements. (German.) Willi Willing. *Gas- und Wasserfach*, v. 93, Aug. 1, 1952, p. 434-437.

Proposes measurement of electric resistance of above in order to indicate their corrosion-protective properties. Three types of wrappings were investigated, those adhering to the metal with-

out application of heat, those requiring heating during application, and a combination of the two types. Results are discussed.

13164 Precision Investment Castings; Cleaning in Molten Caustic Soda. N. L. Evans. *Iron & Steel*, v. 25, Sept. 1952, p. 396-397.

Describes above process which can be used for most metals. (Fe, Ni, Cu, and alloys), notable exceptions being Sn, Pb, Zn, and Al. By using this method investment material is completely freed from the metal. Photographs.

13165* Cathodic Deposits in Monoatamic Layers of Bismuth on Platinum and Gold. (French.) A. Coche, J. Danon, and M. El. Gúebély. *Journal de Chimie Physique et de Physico-Chimie Biologique*, v. 49, June 1952, p. 363-366.

Results of investigation of the above are charted, tabulated, and discussed.

13166 Review of Surface Finish Literature. John W. Sawyer. *Machine Design*, v. 24, Sept. 1952, p. 147, 290, 292, 294, 296, 298, 301-302, 305-306.

Bibliography of above literature published during years 1948-1951. (To be continued.)

13167 Electroplating Large Complex Shapes. F. K. Savage, A. K. Graham, and E. P. Strothman. *Materials & Methods*, v. 36, Aug. 1952, p. 94-97.

Successful use of electroplated coatings on large chemical equipment demonstrates that where applicable, they cost less than clad metals and solid metals and alloys. Illustrated.

13168 Hard Chrome Plating of Aluminum. E. Mayer-Rässler. *Metal Industry*, v. 81, Aug. 15, 1952, p. 127-129.

Describes importance of above; also discusses in detail the most successful method used in applying the Cr plate. Photomicrographs.

13169 Electroplating Steel Springs. *Metal Industry*, v. 81, Aug. 29, 1952, p. 167-168.

Recommendations issued by the Coil Spring Federation Research Organization. Covers principles for cleaning and electroplating hardened and tempered steel springs, or springs made from cold-worked steels.

13170* Influence of Anode Apertures and Specially Shaped Anodes on Distribution With Depth in Galvanic Baths. (German.) J. Steiner and K. Schery. *Metalloberfläche*, sec. B, v. 4, Aug. 1952, p. B113-B116.

Influence of the above on metal distribution at hollow-cylinder cathodes was investigated. Diagrams and graphs.

13171* Anodic Oxidation of Small Aluminum Parts. (German.) Heinz W. Dettner. *Metalloberfläche*, sec. B, v. 4, Aug. 1952, p. B116-B118.

Describes problems encountered in anodic oxidation of small parts in large quantities. Various solutions suggested in a number of German patents are outlined. Diagrams.

13172 Getting the Most From HAE Coatings. M. Frager and H. A. Evangelides. *Metal Progress*, v. 62, Sept. 1952, p. 81-84.

Describes and evaluates HAE electrolytic coating for Mg and Mg alloys. It is a nonmetallic coating which is very hard and adherent. Describes and illustrates results of salt-spray tests. Discusses suitable paint coatings for application on top of the HAE coatings.

13173 The Work of the Protective Coatings (Corrosion) Sub-Committee; British Iron and Steel Research Association. F. Fancutt and J. C. Hudson. *Journal of the Oil & Colour Chemists' Association*, v. 35, Aug. 1952, p. 396-416; disc., p. 416-417.

A survey of results of investigations of protective coatings for structural iron and steel extending over 30 yrs. In the field of painting, research has shown the vital importance of correct surface preparation and the value of using inhibitive priming paints. Basic data were obtained for the performance of Al, Cd, Pb, Sn, and Zn coatings under various conditions of atmospheric exposure. Diagrams.

13174 Rinsing. H. L. Pinkerton. *Plating*, v. 39, Sept. 1952, p. 1016-1017, 1031.

Presents revision of some equations of Kushner which the author believes to give impossible results. Develops improved equations for use in analysis of the process of rinsing articles after removal from the electroplating tank.

13175 Hard Chromium Plate to Improve the Corrosion Resistance of Tool Steel. H. E. Ricks. *Plating*, v. 39, Sept. 1952, p. 1029-1030.

Shows that corrosion protection offered by hard Cr plating was found to be proportional to the thickness of the Cr plate and to the surface smoothness of the panel before plating. Tables and photographs.

13176 Effect of Impurities and Purification of Electroplating Solutions. I. Nickel Solutions. 5. The Effects and Removal of Zinc. D. T. Ewing, A. A. Brouwer, D. D. Clark, C. J .Owen, R. J. Rominski, and J. K. Werner. *Plating*, v. 39, Sept. 1952, p. 1033-1037.

Deals with effect of trace amounts of Zn in nickel solutions on the properties of Ni electrodeposits. Graphs show effects of Zn concentration on luster of deposits, on throwing power of solutions, on corrosion resistance, and on hardness of the deposits.

13177 Chromate Protective Coatings. C. W. Ostrander. *Product Engineering*, v. 23, Sept. 1952, p. 127-134.

Briefly discusses application of above coatings to nonferrous metals (Zn, Al, Cu, and Cu alloys). Describes method of application and cites following advantages: high resistance to corrosion; provision of firm bond for paint; and improved appearance of Zn and Cu plate.

13178* Tin Alloy Plating. *Products Finishing*, v. 16, Sept. 1952, p. 76, 78, 80. (Based on talks by F. A. Lowenheim, and by J. W. Cuthbertson and N. Parkinson.)

First half of the article deals with properties of Sn-Zn alloy deposits and gives bath formulations and conditions for shop use. Second part discusses effect of variables on the composition and properties of Sn-Ni alloys plated from a bath containing stannous chloride, nickel chloride, sodium fluoride, and ammonium bifluoride. Corrosion resistance discussed and formula given.

13179 Precision Production Plating. Perry J. Sloane. *Screw Machine Engineering*, v. 13, Sept. 1952, p. 37-38.

Briefly discusses the precision plating of small metal parts with precious metals. Ag or Au is deposited on various ferrous and nonferrous base metals.

13180 Coated Abrasives Grind Down Costs. Robert E. Hall. *Steel*, v. 131, Aug. 25, 1952, p. 92-97.

A special report on equipment, procedures, and applications. Claims impressive cost reductions through their use and rapid expansion in applications.

13181 Welding Doubles Life of Forging Dies. Arthur L. Phillips. *Steel*, v. 131, Sept. 8, 1952, p. 86-87.

Describes newly developed welding technique which prolongs life of drop-forging dies used in the manufacture of tool-steel claw hammers. Reversal of procedure of extending die life from shaving to building up by welding is applied.

13182* Observation on Iron Tips in the Field-Electron Microscope. (German.) Hans-Walter Schleicher. *Zeitschrift fur Naturforschung*, v. 7a, July 1952, p. 471-474.

Describes an electrolytic-polishing process for producing fine iron tips. Field-electron microscope pictures of such tips are shown to vary greatly. The great differences between iron tips and tungsten or molybdenum tips are ascribed to iron oxide films, the extreme tip being suspected to be an Fe_3O_4 crystal. Diagrams and photographs.

Miscellaneous Publications

13183 Electro-Polishing and Material. Joseph Heyes. 4th International Mechanical Engineering Congress, June 1952, 8 pages.

A survey aimed at drawing attention to the advantages of the above process. Gives test results for electropolishing in relation to fatigue, crystal structure, corrosion, light reflection, and

9. *Cleaning, Finishing, and Coatings—Metallic*

friction and wear. Materials are steel and Al. Table, photomicrographs, and graphs. 11 ref.

13184 Continuous Surface Treatment of Aluminium Strip for the Canning Industry. Dag Nickelsen. 4th International Mechanical Engineering Congress, June 1952, 9 pages.
Describes anodizing and lacquering processes at the Nordisk Co., Oslo, Norway. A company-developed Al-Mg alloy is used.

13185 Surface Treatment for Saving and Substitution of Materials. H. Wiegand. 4th International Mechanical Engineering Congress, June 1952, 4 pages.

Classifies surface treatments for the above and gives numerous brief examples or suggestions for their use. Includes mechanical, chemical, electrochemical, and diffusion processes, and coating with metallic and nonmetallic layers. Metals mentioned include carbon, alloy, and stainless steels, Al alloys, stellites, Zn, and Cr. Tabular data on: influence of thread production and surface quality of thread on tensile fatigue strength of screws; fatigue strength of piston pins, case hardened on all sides—for low alloy and C steels.

See also:
13403 (Al-bronze anticorrosive paint)
13461 (Cr-plating-bath analysis)
13568 (corrosion-preventive coatings for Mg)

10. METALLOGRAPHY AND PRIMARY STRUCTURES

13186* The Iron-Iron Phosphide-Aluminum Phosphide Aluminum Phase Diagram. (German.) Rudolf Vogel and Helmut Klose. *Archiv für das Eisenhüttenwesen*, v. 23, July-Aug. 1952, p. 287-291.

Describes experimental and theoretical details of above investigation, done in the Fe corner, on the basis of thermal and structural investigations. Results are interpreted. Diagrams and micrographs.

13187 Quantitative Metallography With the Electron Microscope. Alfred L. Ellis and F. K. Iverson. *ASTM Bulletin*, July 1952, p. 66-69.

Principles are presented and special problems involved in application of the electron microscope are discussed. It is shown that it can be used advantageously when the particle size is very small. Representative sampling and reproducibility are discussed and results obtained are compared with those obtained by other methods.

13188* The Use of Polarized Light for the Examination of Etched Metal Crystals and Their Orientation. P. Dunsmuir. *British Journal of Applied Physics*, v. 3, Aug. 1952, p. 264-267.
Discusses above. The practical case of examining cold-rolled Si-Fe alloys for preferred orientation is considered. Diagrams and macrographs.

13189* Dilatometric Study of Metallic Dysprosium. (French.) Félix Trombe and Marc Foëx. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences*, v. 235, July 16, 1952, p. 163-165.

Results of investigation of the above, in the region of −195 to +300°C., are charted and compared with those previously reported for gadolinium.

13190* Evidence of the Heterogeneity of a Solid Solution in Equilibrium. (French.) Christopher B. Walker, Jean Blin, and André Guinier. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences*, v. 235, July 21, 1952, p. 254-255.

Redistribution of the atoms in a solid solution, where the atoms have a tendency to separate, was investigated by means of X-ray diffraction. Results for an Al alloy containing 20% Ag, of distribution, are charted and discussed.

13191* Saturation of the Surface of Steel by Tungsten from Gaseous Media. (Russian.) G. N. Dubinin. *Doklady Akademii Nauk SSSR*, new ser., v. 84, June 1, 1952, p. 693-696.
Iron and steel (0.1-1.2% C) specimens were used in the above investigation. Data are tabulated, charted, and illustrated. Includes diagram of the W-Fe diagram.

13192* New Phases in the Aluminium-Germanium-Sodium and Aluminum-Germanium-Lithium Systems. (Russian.) E. A. Boom. *Doklady Akademii Nauk SSSR*, new ser., v. 84, June 1, 1952, p. 697-699.

A microscopic study was made of the above alloys. Results are discussed and illustrated.

13193* Impregnation of Steel Surfaces With Manganese From Gaseous Medio. (Russian.) G. N. Dubinin. *Doklady Akademii Nauk SSSR*, new ser., v. 84, June 21, 1952, p. 1155-1158.
A study of Fe-Mn alloys was made by the above method using iron (0.03% C) and steel (0.1-1.2% C) specimens. Includes tabular data, phase diagrams of the Fe-Mn system, and photomicrographs.

13194* Rounding of Obstacles by the Front of a Growing Layer of a Crystal Face. (Russian.) G. G. Lemmlein. *Doklady Akademii Nauk SSSR*, new ser., v. 84, June 21, 1952, p. 1167-1169.
A microscopic study was made of the growth of thin layers (spiral or plane) of SiC crystals around obstacles. Results are discussed and illustrated.

13195* Crystal Structure of the Ternary Phase Cu_4MgSn. (Russian.) E. I. Gladyshevskii, P. I. Kripiakevich, and M. Iu. Tesliuk. *Doklady Akademii Nauk SSSR*, new ser., v. 85, July 1, 1952, p. 81-84.

X-ray, thermal, and microscopic investigations were made on the above system. Data are tabulated.

13196 The Metallography of Uranium. B. W. Mott and H. R. Haines. *Journal of the Institute of Metals*, v. 80, Aug. 1952, p. 621-627.

Methods of preparing U for examination under polarized light are discussed, and relative merits of various solutions for electrolytic polishing are given. Details of structures observed on sections taken from material in cast, swaged, and hot-worked conditions are described, together with effects of heat treatment and recrystallization. Future developments are discussed. 22 ref.

13197 The Application of Polarized Light to the Examination of Various Anisotropic Metals and Intermetallic Phases. B. W. Mott and H. R. Haines. *Journal of the Institute of Metals*, v. 80, Aug. 1952, p. 629-636.

Details includes methods of preparation of Sb, Be, Bi, Cd, Co, Mg, Sn, Ti, U, Zn, Zr, and of the alloys MgU, ThAl, ThSe, WC, and NAl. Photographs illustrate results. 50 ref .

13198 The Equilibrium Diagram of the System Copper-Indium in the Region 25-35 At.-% Indium. J. Reynolds, W. A. Wiseman, and W. Hume-Rothery. *Journal of the Institute of Metals*, v. 80, Aug. 1952, p. 637-640.

Thermal, microscopical, and X-ray methods were used to determine the above. Diagrams and tables.

13199 The Constitution and Structure of Nickel-Vanadium Alloys in the Region 0-60 At.-% Vanadium. W. B. Pearson and W. Hume-Rothery. *Journal of the Institute of Metals*, v. 80, Aug. 1952, p. 641-652.

The above were investigated by thermal, microscopic, and X-ray methods. The θ phase is of variable composition, and its crystal structure has been determined. Effects of composition on the lattice spacings of the α, θ, and σ phases were studied, and the bearing of the results on the general theory of alloys is discussed briefly. Diagrams and graphs.

13200 Titanium Metallography—Simple, Safe. *Iron Age*, v. 170, Aug. 28, 1952, p. 112.

Describes step-by-step method for above.

13201 The Constitution of Iron-Nickel-Chromium Alloys at 550-800°C. A. J. Cook and B. R. Brown. *Journal of the Iron and Steel Institute*, v. 171, Aug. 1952, p. 345-353.

Reports results obatined from metallographic and X-ray examination (including lattice-parameter measurements) of a series of high-purity Fe-Ni-Cr alloys in an attempt to establish the equilibrium constitution at 550°C. with particular reference to

the development of sigma phase in the alloy system. The alloys investigated contained 0-40% Ni and 0-35% Cr. Tables, phase diagrams, and micrographs.

13202* X-Ray Analysis of Carbides in Tungsten Steel. (Swedish.) Kehsin Kuo. *Jernkontorets Annaler*, v. 136, no. 6, 1952, p. 156-168.

Presents results of experimental investigation of phases existing at different temperatures and their transformations. Tables and X-ray patterns. 17 ref.

13203 Observations on the Lattice Parameters of the Alpha and TiO Phases in the Titanium-Oxygen System. W. Rostoker. *Journal of Metals*, v. 4, Sept. 1952; *Transactions of American Institute of Mining and Metallurgical Engineers*, v. 194, 1952, p. 981-982.

Reports of a study of the above. Graphs. 14 ref.

13204 System Molybdenum-Boron and Some Properties of the Molybdenum-Borides. Robert Steinitz, Ira Binder, and David Moskowitz. *Journal of Metals*, v. 4, Sept. 1952; *Transactions of American Institute of Mining and Metallurgical Engineers*, v. 194, 1952, p. 983-987.

Above is discussed in relation to raw materials and preparation, experimental procedures, room-temperature phases, and structures and properties of Mo borides. The system was studied from 0 to 25% B. Structural, physical, mechanical and oxidation-resistant properties were determined. Diagrams, graphs, and tables. 14 ref.

13205 Note on the Effect of Oxygen and Nitrogen on the Hardness and Lattice Parameter of High Purity Vanadium. S. Beatty. *Journal of Metals*, v. 4, Sept. 1952; *Transactions of American Institute of Mining and Metallurgical Engineers*, v. 194, 1952, p. 987-988.

Briefly describes procedure and results.

13206 A Simple Method of Determining Orientation in Recrysatllized Wires of the Cubic System. T. S. Hutchinson. *Journal of Scientific Instruments*, v. 29, Aug. 1952, p. 257-258.

The above method is used where the grain size is greater than 10^{-2} cm. Standard physics-laboratory equipment is used.

13207* Copper-Beryllium Alloys, and Their Use in Industry. (German.) W. Deisinger. *Metall*, v. 6, Aug. 1952, p. 436-440.

Discusses the binary Cu-Be system, and applications of Be-Cu alloys (Cu-base). Mechanical properties are charted. Micrographs illustrate typical structures.

13208* Structure of Metal Surfaces. (According to New Investigations by Electron Beams.) (German.) H. Raether. *Metalloberfläche*, sec. A, v. 6, Aug. 1952, p. A113-A119.

Describes the mechanism of surface analysis by means of electron beams. Results of the investigation on mechanically and electrolytically polished metal surfaces are indicated and interpreted. Electron micrographs and diffraction patterns. 12 ref.

13209* Contribution to Investigation of the Cr_2O_3-FeO-SiO_2 System. (Italian.) Raffaello Zoja. *Metallurgia Italiana*, v. 44, July 1952, p. 247-249.

Special difficulties encountered in investigation of above type of system are pointed out. Procedures developed to overcome them are described. By these means position of 3 binary eutectics and of the ternary eutectic was determined rather approximately.

13210 Thermal Etching of Iron and Steel. M. J. Olney. *Metal Treatment and Drop Forging*, v. 19, Aug. 1952, p. 347-354.

Survey of literature dealing with above with special reference to the theoretical aspects. Experimental results obtained by heating and cooling polished steel specimens "in vacuo" are described and discussed. Photomicrographs. 27 ref.

13211* Present State of the Metallography of Alloyed Austenites, Particularly in 18-8 Steel. (French.) P. Bastien and J. Dedieu. *Métaux: Corrosion—Industries*, v. 27, June 1952, p. 237-244.

Discusses influence of allotropy of iron, role of carbon, the carbides, the eutectoid composition, regions of coexistence of alpha, gamma, and carbide phases. Includes schematic drawings and tabular data. 11 ref.

13212 A New Molybdenum Carbide. K. Kuo and C. Hagg. *Nature*, v. 170, Aug. 9, 1952, p. 245-246.

Studies of products formed by carburizing Mo with Co confirmed existence of Mo_2C (β-phase) and MoC (γ-phase), the latter having the WC structure. In addition a new carbide was found. Describes and discusses its transformations and lattice parameters.

13213 The Specific Heats of Several Metals Between 1.8° and 4.2°K. I. Estermann, S. A. Friedberg, and J. E. Goldman. *Physical Review*, v. 87, Aug. 15, 1952, p. 582-588.

Specific heats of Mg, Ti, Zr, and Cr were measured between 1.8° and 4.2°K by the vacuum calorimeter method. Electronic contribution to specific heats of these metals was in agreement with the Sommerfeld theory and with results of recent detailed calculations of energy bands in transition metals.

13214 Asymmetry of Texture in Cubic Crystals Grown From the Melt. P. R. Rowland. *Proceedings of the Physical Society*, v. 65, sec. B, Aug. 1, 1952, p. 572-574.

Discussion of electropolishing of single-crystal spheres of Cu grown from melt revealed that they appear to consist of a number of parallel crystallites of square cross section with their lengths parallel to the (001) axis which lies nearest in direction to the "direction of growth" in the melt.

13215* Micrographic Coloring Reagents for Iron and Steels. (French.) L. Beaujard. *Revue de Métallurgie*, v. 49, July 1952, p. 531-538.

Describes use of various reagents for study of the structure of surface layers of the above. Discusses in particular use and results with sodium bichromate, sodium nitrate, and sodium nitrite. Micrographs.

13216* How to Embed Microsections in Casting Resin. (German.) Cord Peterson. *Zeitschrift für Metallkunde*, v. 43, July 1952, p. 250-251.

Diagrams and describes suitable method for the above.

13217* Structure of the Copper-Germanium System. (German.) Konrad Schubert and Gundolf Brandauer. *Zeitschrift für Metallkunde*, v. 43, July 1952, p. 262-268.

Reports on high-temperature X-ray investigations of the above system. Their structures are interpreted. Data are tabulated and charted. 34 ref.

Miscellaneous Publications

13218 Microconstituents in High Temperature Alloys. H. J. Beattie, Jr. and F. L. VerSnyder. American Society for Metals, Preprint 1, 1952, 27 pages. (TS300 Am35p)

By use of microstructural studies and X-ray diffraction analysis of electrolytically separated residues, the microconstituents of Fe-, Co-, and Ni-base high-temperature alloys were studied. The techniques used are described in detail. The results show, in particular, some of the effects of Te and Mo as alloying additions. Occurrence and suggested mode of formation of titanium carbonitride in a Ni-base age-hardenable alloy were determined. Conclusions applicable to most air-melted Te-containing alloys are drawn. The intermetallic compounds M_3Ti and Fe_2Al were identified and discussed. The second Brillouin zone is considered for the complex carbides M_6C and $M_{23}C_6$, with resulting determination of ratio of electron to metal atom capacity of about 7:1. 13 ref.

13219 Sigma Formation and Its Effect on the Impact Properties of Iron-Nickel-Chromium Alloys. A. M. Talbot and D. E. Furman. American Society for Metals, Preprint 2, 1952, 12 pages, (TS300 Am35p)

Approximate σ-phase boundaries between 1200 and 1650°F. were located by metallographic means for Fe-Ni-Cr alloys of relatively high alloy content and of simulated commercial quality. For conditions approaching equilibrium, the limiting σ-boundary was found to extend from about 21% Cr at 20% Ni to 24% Cr at 35% Ni. The effectiveness of Si in moving the sigma area to lower Cr contents was shown.

10. *Metallography and Primary Structures*

13220 The Titanium-Oxygen System. E. S. Bumps, H. D. Kessler, and M. Hansen. American Society for Metals, Preprint 32, 1952, 18 pages. (TS300 Am35p)

Gives details of partial phase diagram based principally on results of micrographic analysis of arc-melted alloys containing up to 30% O_2. Lattice-parameter measurements are presented for both the α and TiO phases, and hardness-test results are presented for alloys containing up to 30% O_2. Tables, graphs, and photomicrographs. 15 ref.

13221 The System Zirconium-Tin. D. J. McPherson and M. Hansen. American Society for Metals, Preprint 34, 1952, 17 pages. (TS300 Am35p)

Zr-Sn alloys were prepared and heat treated under protective conditions. The phase diagram was established, based on micrographic and X-ray diffraction analysis, metallographic detection of incipient melting, and thermal analysis. Tables, graphs, and photomicrographs.

13222 The Indium-Arsenic System. T. S. Liu and E. A. Peretti. American Society for Metals, Preprint 40, 1952, 9 pages. (TS300 Am35p)

Above system was investigated by thermal, X-ray, and metallographic methods. Existence of an intermediate phase corresponding closely to the composition InAs was confirmed.

13223 The System Zirconium-Silicon. C. E. Lundin, D. J. McPherson, and M. Hansen. American Society for Metals, Preprint 41, 1952, 14 pages. (TS300 Am35p)

Phase diagram of the above was determined, with particular emphasis on the Zr-rich portion. The principal methods used were metallography of cast and heat-treated specimens, detection of incipient melting, thermal analysis, and X-ray diffraction analysis.

13224 The Iron-Nickel-Nitrogen System. H. Mühlberg. Henry Brutcher, Translation 2867, 5 pages. (Condensed from author's doctorate thesis, Heidelberg University, Sciences and Mathematics Faculty, 1948.)

A study of above. Data on N absorption by Fe-Ni alloys containing 10-100% Fe. Absorption vs. temperature. X-ray study of single-nitrided alloys. New method of double nitriding with phase data. Graphs.

13225 On a Surface-Active Constituent of Steel. S. M. Baranov. Henry Brutcher, Translation 2880, 5 pages. (From *Doklady Akademii Nauk SSSR*, new ser., v. 83, Mar. 1, 1952, p. 125-128.)

Previously abstracted from original.

See also:

13043 (microstructure of low-temperature steels)
13065 (microstructure of Republic Ti and Ti alloys)
13103 (inclusions in Bessemer steels)
13129 (crossed-gradient method in metallography)
13148 (structure of Cu-Mn-Si alloys)
13182 (electron-microscope observations of Fe)
13227 (Fe-Mo system)
13331 (creep vs. microstructure of austenitic stainless steel)
13357 ("magnetic metallography")
13358 (fractographic study of embrittlement in stainless steel)
13360 (influence of Si and Mn on structure of forged steel)
13364 (microstructure of high-temperature steels)
13409 (structure of Al-Si alloys)
13492 (X-ray diffraction technique)
13538 (aligning single crystals for X-ray diffraction)
13549 (precision cameras for microstructural investigation)
13557 (study of surface structure of metals)
13583 (constitution diagram of Cu-Be alloys)
13673 (microstructure of Zr carbide-Cb cermet)
13855 (nuclei formation and orientation of Ag deposited on crystals)

11. METALS—TRANSFORMATIONS AND RESULTING STRUCTURES

13226* A Note on the Graphitization of Martensite. J. W. Grant. *British Cast Iron Research Association Journal of Research and Development*, v. 4, Aug. 1952, p. 366-368.

Results of tests to investigate formation of graphite nodules from martensite, following heat treatment, in prequenched specimens of nodular and flake graphite irons. Photographs.

13227* Saturation of Steel Surfaces by Molybdenum From Gaseous Media. (Russian.) G. N. Dubinin. *Doklady Akademii Nauk SSSR*, new ser., v. 84, June 11, 1952, p. 935-938.

Experiments on the above were used to study diffusion and the properties of Fe-Mo alloys. Data are tabulated and illustrated. Phase diagram and micrographs. 12 ref.

13228 The Cubic-Tetragonal Transformation in Manganese-Copper Alloys. Z. S. Basinski and J. W. Christian. *Journal of the Institute of Metals*, v. 80, Aug. 1952, p. 659-666.

Mn-rich Mn-Cu alloys were investigated by X-ray and microscopic methods. Etched microspecimens of tetragonal alloys show a banded structure, which is also produced by heating and cooling electropolished specimens through the transformation range. Some difficulties in connection with possible dislocation theories of the actual atom movements are indicated. 19 ref.

13229 Recrystallization Kinetics of Low Carbon Steel. Stanley F. Reiter. *Journal of Metals*, v. 4, Sept. 1952, *Transactions of American Institute of Mining and Metallurgical Engineers*, v. 194, 1952, p. 972-979.

Presents isothermal recrystallization curves for 0.08 and 0.15% C steel at subcritical temperatures following small amounts of plastic deformation. Effects of deformation, temperature, aging on nucleation and growth rates are described; and free energy of activation for grain-boundary migration in steel is given. Micrographs, graphs, and tables. 16 ref.

13230 Do Metals Recrystallize? Paul A. Beck. *Journal of Metals*, v. 4, Sept. 1952; *Transactions of American Institute of Mining and Metallurgical Engineers*, v. 194, 1952, p. 979-980.

See abstract from *American Society for Metals*, "Metal Interfaces", 1952, p. 208-247. (TA407 Am35m)

13231 Effect of Cold Work on Sigma Formation. E. J. Dulis and G. V. Smtih. *Metal Progress*, v. 62, Sept. 1952, p. 86-87.

Brief discussion of above with respect to 2 austenitic stainless steels. Graphs and photomicrographs.

13232 Effect of Deformation on Transformation of Austenite to Martensite. *Metal Progress*, v. 62, Sept. 1952, p. 146, 148, 150, 152. (Translated and condensed from "Transformation of Deformed Austenite Into Martensite", G. V. Kurdyumov, O. P. Maksimova, and T. V. Tagunova. *Doklady Akademii Nauk SSSR*, new ser., v. 73, July 11, 1950, p. 307-310.

Previously abstracted from original.

13233 The Growth From the Melt of Single Crystals of Low Melting Point Metals. A. J. Goss and S. Weintroub. *Proceedings of the Physical Society*, v. 65, sec. B, Aug. 1, 1952, p. 561-571; disc., p. 571-572.

Discusses experiments on preparation of Sn, Pb, Zn, and Bi single crystals in the form of rods. Effects on crystallization of temperature gradient and rate of growth, are studied and results compared. Tables and graphs.

13234* Crystal Growth and Dislocations. (English.) F. C. Frank. *Zeitschrift für Elektrochemie; Berichte der Bunsengesellschaft für Physikalische Chemie*, v. 56, no. 5, 1952, p. 429-436; disc., p. 437-438.

Presents extensive theoretical discussion of the above. Examples of observations of various investigators are described and illustrated. 21 ref.

13235* Formation and Development of Zones and Precipitates in Supersaturated Solid Solutions. (French.) A. Guinier. *Zeitschrift für Elektrochemie; Berichte der Bunsengesellschaft für Physikalische Chemie*, v. 56, no. 5, 1952, p. 468-473.

Describes formation and growth of crystal nuclei of an Al + 4% Cu alloy as a good example of the above hardening. Graphs, tables, diagrams, and photomicrographs. 10 ref.

13236* **Self-Diffusion on Copper Surfaces.** (German.) Erich Menzel. *Zeitschrift für Physik*, v. 132, no. 4, July 1952, p. 508-528.
Describes and discusses measurement of above and effect of time, temperature, air, hydrogen, and oxygen pressures. The surrounding atmosphere was found to have a very material effect on the results. Photographs, diagrams, and graphs. 33 ref.

Miscellaneous Publications

13237 The Electrolytic Separation and Some Properties of Austenite and Sigma in 18-8-3-1 Chromium-Nickel-Molybdenum-Titanium Steel. T. P. Hoar and K. W. J. Bowen. American Society for Metals, Preprint 4, 1952, 19 pages. (TS300 Am35p)
Gives details of experimental technique and of results obtained in above investigation. Transformations of extracted and massive austenite are compared. Ferromagnetic properties at low temperatures, compositions, and electrode potentials of the two varieties are also compared.

13238 Recrystallization and Grain Growth in Alpha Brass. S. L. Channon and H. L. Walker. American Society for Metals, Preprint 8, 1952, 20 pages. (TS300 Am35p)
Cold-rolled commercially pure 70/30 cartridge brass samples of different initial grain sizes were annealed isothermally at various temperatures for various times. Recrystallized grain size was found to be independent of temperature of annealing, and was related to the degree of deformation by an empirical equation. 20 ref.

13239 The Effect of Composition on the Temperature of Spontaneous Transformation of Austenite to Martensite in 18-8-Type Stainless Steel. G. H. Eichelman, Jr. and F. C. Hull. American Society for Metals, Preprint 9, 1952, 19 pages. (TS300 Am35p)
Above was determined by dilatometric measurements. It can be expressed by a simple linear equation. Relative effectiveness of the additions, in their normal composition ranges, in lowering the M_s temperature increases in the following order: Si, Mn, Cr, Ni, C, and N_2. M_s changes caused by carbide precipitation can be used as a sensitive means for determining solubility of C in stainless steel.

13240 The Order-Disorder Transformation Viewed as a Classical Phase Change. F. N. Rhines and J. B. Newkirk. American Society for Metals, Preprint 12, 1952, 18 pages. (TS300 Am35p)
The question of whether order-disorder transformations are normal Gibbsian phase changes, or are 2nd-order transformations, is reviewed by re-examination of published evidence and by new resistivity and X-ray diffraction observations on Cu-Au and Cu-Zn alloys. All of the evidence supports the view that order-disorder transformations are normal phase changes.

13241 The Martensite Transformation Temperature in Titanium Binary Alloys. Pol Duwez. American Society for Metals, Preprint 35, 1952, 7 pages. (TS300 Am35p)
Above temperature was measured in binary alloys of Ti with Cb, Ta, W, Fe, Cr, and Mn. The critical concentration above which the β-structure is retained after quenching in the above-mentioned binary alloys is discussed in connection with results published by other investigators. 13 ref.

13242 On the Mechanism of the Influence of a Preceding Quench Upon the Rate of Graphitization of Cast Iron. K. P. Bunin and N. M. Danil'chenko. Henry Brutcher, Translation 2868, 5 pages. (From *Doklady Akademii Nauk SSSR*, new ser., v. 82, Jan. 21, 1952, p. 381-383.)
Previously abstracted from original.

Books

13243* **Atom Movements.** 240 pages. 1951. American Society for Metals, Cleveland. (QC185 Am35a)
Comprises following papers presented at 32nd National Metal Congress and Exposition, Chicago, Oct. 21-27, 1950: "Formal Basis of Diffusion Theory", L. S. Darken; "Chemical Techniques and Analysis of Diffusion Data", Cyril Wells; "Tracer and Other Techniques of Diffusion Measurements", R. E. Hoffman; "Mechanisms of Diffusion", H. B. Huntington; "Diffusion in Alloys and the Kirkendall Effect", J. Bardeen and C. Herring; "Volume Diffusion—An Empirical Survey", C. E. Birchenall; "Grain Boundary and Surface Diffusion", D. Turnbull; "Diffusion and High Temperature Oxidation of Metals", Carl Wagner; "Gas-Metal Diffusion and Internal Oxidation", F. N. Rhines; "Diffusion in Sintering", Pol Duwez; "The Migration of Grain Boundaries", J. E. Burke; and "Summary", Robert F. Mehl.

See also:
13152 (austenite transformations of irons and steels)
13202 (phase transformations in tungsten steel)
13212 (phase transformations of a new Mo carbide)
13336 (strain aging of sheet steels)
13369 (transformations in weldable structural steels)
13370 (graphitization of steels)

12. METALS—PHYSICAL PROPERTIES AND TESTS

13244* **Vibralloy—a New Ferromagnetic Alloy.** M. E. Fine. *Bell Laboratories Record*, v. 30, Sept. 1952, p. 345-348.
Discusses above cold-worked Fe-Ni alloys containing 9% Mo whose temperature coefficient of elastic modulus may be controlled over a wide range. Also they have substantial ferromagnetic permeability and high mechanical strength. Graphs show variation of Young's modulus and permeability with temperature and composition.

13245 The Reactions of Titanium Tetraiodide on Heated Titanium and Tungsten Surfaces. T. R. Ingraham and L. M. Pidgeon. *Canadian Journal of Chemistry*, v. 30, Sept. 1952, p. 694-697.
Shows that when TiI_4 is passed over a hot bar of Ti metal, reactions depend on whether temperature of bar is above or below 1100°C. If temperature is below 1100°C., Ti is rapidly etched from bar to form TiI_2, which through further reaction with TiI_4 is converted to TiI_3. Above 1100°C., TiI_4 is decomposed to Ti and I_2. When a tungsten bar is used, etching and deposition reactions of Ti are separated.

13246* **Dilatometric Study of Metallic Gadolinium.** (French.) Felix Trombe and Marc Foëx. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences*, v. 235, July 7, 1952, p. 42-44.
Metallic Gd was investigated at temperatures between −195 and 300°C. Results are charted and interpreted.

13247* **Contribution to the Study of the Conductivity of Silicon.** (French.) Marcel Perrot and Jean Tortosa. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences*, v. 235, July 16, 1952, p. 143-145.
The conductivity of thin strips of Si prepared by thermal evaporation of a 98.75% Si thin film onto glass was investigated. Results are charted and discussed.

13248* **Investigation of Ferromagnetic Resonance in Cr-Te Alloys.** (Russian.) T. M. Perekalina. *Doklady Akademii Nauk SSSR*, new ser., v. 84, May 21, 1952, p. 475-476.
An experimental study was made of the above, containing 50 at. % Te. Data are charted and discussed.

13249* **The Influence of Halide Ions on the Adsorption of Organic Cations by the Surface of Iron.** (Russian.) Z. A. Iofa, E. I. Liakhovetskaia, and K. Sharifov. *Doklady Akademii Nauk SSSR*, new ser., v. 84, May 21, 1952, p. 543-546.
A study was made of the above. Data are tabulated and charted. 13 ref.

13250* **Paramagnetic Resonance Absorption in Metals.** (Russian.) S. A. Al'tshuler, V. Ia. Kurenev, and S. G. Salikhov. *Doklady Akademii Nauk SSSR*, new ser., v. 84, June 1, 1952, p. 677-679.
Above was investigated for 20 nonferrous metals. Data are tabulated and charted.

13251* **Temperature Dependence of the Magnetic Strength of Iron-Nickel Alloys.** (Russian.) E. F. Kuritsyna. *Doklady Akademii Nauk SSSR*, new ser., v. 84, June 1, 1952, p. 687-688.
Fe-Ni alloys containing 35, 50, and 78.5% Ni were investigated. Data are charted.

12. *Metals—Physical Properties and Tests*

13252* Adsorption and Solution of Hydrogen by Dispersed Palladium-Rhodium Alloys. (Russian.) I. P. Tverdovskii and A. I. Stetsenko. *Doklady Akademii Nauk SSSR*, new ser., v. 84, June 11, 1952, p. 997-1000.

An experimental study was made of the above. Data are charted.

13253* Ultrathin Magnetic Alloy Tapes With Rectangular Hysteresis Loops. M. F. Littman. *Electrical Engineering*, v. 71, Sept. 1952, p. 792-795.

The alloys chosen for study were those having high permeability and relatively high resistivity to minimize eddy-current effects. They were as follows: 3% Si iron; 48% Ni + 52% Fe; 79% Ni + 4% Mo + 17% Fe; and 79% Ni + 5% Mo + 16% Fe. They were rolled to thickness between ½ and 1 mil. D.c. magnetization curves, hysteresis loops, and variation of ratio of residual to maximum induction with magnetizing force for ¼-mil. cores are charted.

13254* Electrical Contact Resistance Between Metallic Surfaces Subjected to Various Treatments. T. Fukuroi and Y. Muto. *Engineers' Digest*, v. 13, Aug. 1952, p. 261-262. (Condensed from *Science Reports of the Research Institutes, Tohoku University*, ser. A, v. 3, June 1951, p. 281-291.)

Describes test apparatus and experimental results obtained with tungsten rods subjected to the following treatments: mechanical polishing, electro-polishing, and electrolytic etching. Diagrams and tables.

13254a Studies on the Anodic Behavior of Nickel. (German.) I. G. Trümpler and Hch. Meyer. *Helvetica Chimica Acta*, v. 235, no. 4, 1952, p. 1304-1310.

Reports experimental arrangement and results of above investigation. Apparatus described makes it possible to follow the transition from an active state to a strongly passive one, also the reverse process.

13255 How Ferromagnetism Works. R. H. Esling. *Iron Age*, v. 170, Sept. 11, 1952, p. 148-152.

Presents basic principles of above for understanding varied equipment such as electric generators and motors, lifting magnets, solenoids in switches and valves, and permanent magnet applications. Diagrams.

13256 Some Effects of Order-Disorder in Iron-Aluminium Alloys. W. D. Bennett. *Journal of the Iron and Steel Institute*, v. 171, Aug. 1952, p. 372-380.

Reports influence of varying degress of order on magnetic and electrical properties of an alloy. Fe_3Al was used because it is magnetic, has a high electrical resistivity, and can readily be ordered or disordered by heat-treatment. Graphs. 11 ref.

13257 Phosphorus-Oxygen Equilibria in Liquid Iron. J. B. Bookley, F. D. Richardson, and A. J. E. Welch. *Journal of the Iron and Steel Institute*, v. 171, Aug. 1952, p. 404-412.

Study of thermodynamics of the P-O_2 equilibrium in liquid Fe by bringing the P content of liquid Fe to equilibrium with a mixture of tetracalcium phosphate ($Ca_4P_2O_9$) and CaO, and a controlled-gas atmosphere of water vapor and Hg_2. Graphs. 11 ref.

13258 Measurement of the Internal Energy in Copper Introduced by Cold Work. Benjamin Welber. *Journal of Applied Physics*, v. 23, Aug. 1952, p. 876-881.

Interpretation of a determination made on the ratio of stored energy expended in cold-working Cu by twisting. Ratios of about 0.03 were found in 3 cylindrical samples which were cold-worked to the extent of 8-12 cal./g. 17 ref.

13259 Effect of Manganese on the Activity of Sulphur in Liquid Iron and Iron-Carbon Alloys. J. P. Morris. *Journal of Metals*, v. 4, Sept. 1952; *Transactions of American Institute of Mining and Metallurgical Engineers*, v. 194, 1952, p. 939-940.

Describes experimental procedure and results of study of the above. Tables and graphs.

13260 Heats of Solution of Group I-B Metals in Liquid Tin. L. B. Ticknor and M. B. Bever. *Journal of Metals*, v. 4, Sept. 1952; *Transactions of American Institute of Mining and Metallurgical Engineers*, v. 194, 1952, p. 941-945.

An isothermal calorimeter for measurements of heats of solution in liquid tin is described. Measurements of the heats of solution of Au, Ag, Cu and an Au-Ag alloy; and heat of formation of Au-Ag alloys, are reported. Tables and diagram. 13 ref.

13261* The Conductivity of Pure Copper and the Effects of Additions on This Conductivity. (German.) F. Pawlek. *Metall*, v. 6, Aug. 1952, p. 434-435.

Conductivity of 99.997% pure sintered Cu wire, and increases in conductivity caused by small additions of Fe, Sb, Pb, As, Ni, Si, P, Ag, and Cd were determined. Details of the experiments are indicated; data are charted.

13262* Electrochemical Transformations in Friction Systems at Elevated Temperatures, and Their Influence on Wear in Machines. (German.) H. Schiffers. *Metalloberfläche*, sec. A, v. 6, Aug. 1952, p. A120-A124.

Discusses the mechanism of friction, and the special conditions existing in machinery. Electrochemical transformations are described and interpreted, and laws governing these transformations are outlined. Data are tabulated. 14 ref.

13263* A New Calculation of Some Properties of Metallic Beryllium. B. Donovan. *Philosophical Magazine*, ser. 7, v. 43, Aug. 1952, p. 868-874.

A quantum mechanical calculation of lattice constant, compressibility, cohesive energy, and work function of above was carried out, using an extension of the cellular method of Wigner and Seitz. With exception of work function, the results agree satisfactorily with experiment and compare favorably with values obtained by more elaborate methods. Graphs. 14 ref.

13264* The Electrical Resistance of Magnesium, Aluminium, Molybdenum, Cobalt, and Tungsten at Low Temperatures. J. G. Thomas and E. Mendoza. *Philosophical Magazine*, ser. 7, v. 43, Aug. 1952, p. 900-910.

Discusses above metals separately in respect to measurements of resistance in zero magnetic field; magnetoresistance and susceptibility. Graphs. 23 ref.

13265* The Extra Electrical Resistance Due to Cold Work and Neutron Irradiation of Platinum. R. A. Dugdale. *Philosophical Magazine*, ser. 7, v. 43, Aug. 1952, p. 912-914.

Reports results of recent experiments on fixing of the extra resistance produced in Pt wire by cold work and by neutron bombardment.

13266 The Gyromagnetic Ratios of the Ferromagnetic Elements. G. G. Scott. *Physical Review*, ser. 2, v. 87, Sept. 1, 1952, p. 697-699.

Above ratios for Fe, Co, and Ni were determined by means of a technique involving a sensitive torsional pendulum. Results on Ni and Co are discussed. Tables.

13267 Gyromagnetic Ratios of Iron, Cobalt, and Many Binary Alloys of Iron, Cobalt, and Nickel. S. J. Barnett and G. S. Kenny. *Physical Review*, ser. 2, v. 87, Sept. 1, 1952, p. 723-734.

Above ratios were determined by measurements on the Einstein-de Haas effect as made in the Norman Bridge Laboratory. Improvements were made in method of eliminating large quadrature torques, in method of reducing disturbances due to vibrations of building, in method of frequency control, in design of square wave commutator, and in design of rotors. Photographs, graphs, and tables.

13268 The Magnetic Properties of Superconducting Alloys of Indium and Thallium. W. F. Love, E. Callen, and F. C. Nix. *Physical Review*, ser. B, v. 87, Sept. 1, 1952, p. 844-847.

Magnetization curves for spherical samples of a series of alloys in the solid solution range of Te in In were measured as a fuction of temperature and composition, and critical field curves were obtained. Graphs.

13269 The Spectroscopy of the Solid State: Copper and Chromium. E. M. Gyorgy and G. G. Harvey. *Physical Review*, ser. B, v. 87, Sept. 1, 1952, p. 861-862.

$M_{2,3}$ emission curves of Cu and Cr were obtained by using a vacuum recording spectrograph. Tabulated results.

13270 Optical Polarization in Single Crystals of Tellurium. J. J. Loferski. *Physical Review*, ser. B., v. 87, Sept. 1, 1952, p. 905-906.

Transmission of Te crystals was observed in the infrared, and measured as a function of polarization of incident radiation relative to the C-axis of the crystal. Graphs present results.

13271 Neutron Total Cross Section for Lead Between 37 and 156 Mev. A. E. Taylor and E. Wood. *Physical Review*, ser. B, v. 87, Sept. 1, 1952, p. 907-908.

Briefly describes method and results for the above work.

13272 Size Effects in the Superconductivity of Cadmium. M. C. Steele and R. A. Hein. *Physical Review*, ser. B, v. 87, Sept. 1, 1952, p. 908.

Brief account is given of the study of electrical and magnetic properties of matter below 1°K. Cd pellets were used.

13273 The Magneto-Resistance of Ferromagnetic Al-Si-Fe Alloys. R. Parker. *Proceedings of the Physical Society*, v. 65, sec. B, Aug. 1, 1952, p. 616-620.

By extending the treatment in an earlier paper, an equation is derived for saturation magneto resistance of mixed ferromagnetic alloys as a function of composition and temperature. Results are in agreement with experiment for the Al-Si-Fe alloy system.

13274 Transparent Conducting Films. E. J. Gillham and J. S. Preston. *Proceedings of the Physical Society*, v. 65, sec. B, Aug. 1, 1952, p. 649.

Outlines results of observations on very thin gold films on glass and on oxide substrates, with respect to resistivity and optical properties.

13275* Heat Transfer in Metal Melts in the Immediate Neighborhood of the Solid/Liquid Phase Boundry. (German.) Otto Schaaber. *Zeitschrift für Metallkunde*, v. 43, July 1952, p. 251-258.

The stationary heat flow near the fusion points of Zn, Al, and KNO_3 in vertical and horizontal directions was investigated. Experimental details are indicated, results discussed. Proposes an explanation for peculiarities of the flow observed in a horizontal direction. Charts and diagrams. 12 ref.

13276* The Electrical Resistance of Thin Tin Films With Lattice Distortions. (German.) Johannes Niebuhr. *Zeitschrift für Physik*, v. 132, no. 4, July 1952, p. 468-481.

Study of above with different Sn thicknesses and temperature includes theoretical explanation of increasing specific resistance with decreasing thickness. Graphs and tables. 21 ref.

See also:

13110 (physical properties of sintered iron)
13121 (sintered permanent magnets)
13151 (physical properties of tempered steels)
13204 (physical properties of Mo borides)
13237 (ferromagnetic properties of 18-8-3-1 Cr-Ni-Mo-Ti steel)
13320 (physical properties of test steels)
13348 (Zr and its alloys with O_2)
13373 (physical properties of sintered parts)
13570 (physical properties of Ni and Ni alloys)
13580 (physical properties of alloy steels for jet engines)
13583 (physical properties of Be and alloys)
13716 (surface tension of Fe, Ni, and Si on ceramic oxides)
13725 (properties of self-lubricating bearings)
14051 (semiconductive properties of Te)
14172 (properties of Alnico magnet compositions)

13. METALS—MECHANICAL PROPERTIES AND TESTS

13277* High Strength Light Alloys. P. G. Giles and P. F. Kiddle. *Aircraft Engineering*, v. 24, Sept. 1952, p. 265, 273.

Briefly discusses certain problems arising from use of Al-Zn-Mg-Cu and duralumin-type alloys including stress, strain, loss of ductility, and aging. Tables and graphs.

13278* Hot Brittleness of Nickel-Chromium Steels. (German.) Gustav Hoch. *Archiv für das Eisenhüttenwesen*, v. 23, July-Aug. 1952, p. 257-275; disc., p. 275-276.

Comprehensively reviews various brittleness phenomena, and gives quantitative data on types of brittleness. Describes in particular, brittleness occurring after prolonged annealing, and gives experimental results of notch-impact and hot tensile tests on Cr-Ni stainless steels. Data are tabulated, charted, and illustrated by micrographs. 14 ref.

13279* Determination of Residual Stresses in Finished Pieces. (German.) Hans Bühler. *Archiv für das Eisenhüttenwesen*, v. 23, July-Aug. 1952, p. 293-297.

Describes stress measurements done on steel cylinders by means of G. Sachs' drilling process. The effect of area of the end surface, and of length, upon results is indicated. Application of the method to hollow cylinders is proposed. Data are tabulated and charted.

13280* Alternating Tension- and Compression-Stress Fatigue Strength and Changes in the Properties of Steels After Various Rates of Cold Forming. (German.) Hans-Rolf Sander and Max Hempel. *Archiv für das Eisenhüttenwesen*, v. 23, July-Aug. 1952, p. 299-320.

Reviews the above on the basis of the literature. Details of experiments are described in order to complement data in the literature. Results of various tests are indicated. Tables, charts, micrographs and 54 ref.

13281 The Effect of Shot Peening on Damage Caused by Cavitation. Nicholas Grossman. *ASTM Bulletin*, July 1952, p. 61-66.

Shot peening was found to reduce cavitation damage of two carbon steels and one brass. The amount of decrease varied from 7 to 58% for the different materials. Apparatus and procedure are described, diagrammed, and illustrated. Results are tabulated, charted, and illustrated.

13282* Influence of Graphite and the Matrix on Some Mechanical Properties of Common Cast Irons. (Portuguese.) Werner Grundig. *Boletim da Associaçao Brasileira de Metais*, v. 8, Jan. 1952, p. 77-107.

Tension, bending, and hardness properties were investigated in 31 common cast-iron test bars with a predominantly pearlitic or hypereutectoid matrix. Among other factors, the effect of deformation of the graphite and of degree of saturation of the metallic matrix were studied. Photographs and tables. 14 ref.

13283* The Effect of Water Corrosion and Shot Peening on Fatigue Strength of Mining Drill Rods. T. W. Wlodek. *Canadian Mining and Metallurgical Bulletin*, v. 45, Aug. 1952, p. 470-477; disc., p. 477-478; *Transactions of the Canadian Institute of Mining and Metallurgy*, v. 55, 1952, p. 292-299; disc., p. 299-300.

Results of research into the fatigue properties of SAE-1080 carbon steel and low-alloy Ni-Cr-Mo steel for mining drill rods are analyzed and described in detail. Above was investigated and 8 S-N curves for as-rolled and shot-peened mining drill rods under both dry and water-corrosion conditions were derived, and their shape and relative position are discussed. Main features relating to field performance of the drill rods are analyzed.

13284 A Yield Criterion for Ductile Metals Based Upon Atomic Structure. Milton C. Shaw. *Journal of The Franklin Institute*, v. 254, Aug. 1952, p. 109-126.

A strength theory for ductile metals is presented that takes into account short range inhomogeneities that are present in all commercial metals. Examples are presented to illustrate the shortcomings of conventional maximum shear-stress and distortion energy theories that result from failure of these theories to recognize the inhomogeneous nature of metals. Shows why a size effect is observed with torsion specimens but not with tensile specimens of usual size. The size effect in fatigue testing and hardness testing by means of micro techniques is discussed. Relation of the new theory for ductile metals to the statistical theory of Weibull for brittle materials is considered. 21 ref.

13285* On the Theory and Its Application of Two-Dimensional Plasticity. (Japanese.) Yoshiaki Yamada. *Report of the Institute of Industrial Science, University of Tokyo*, v. 1, no. 5, Feb. 1951, p. 151-168.

Deals with the problem of plastic flow as a plane, or two-dimensional, problem of mathematical plasticity. In Sec. 1, a general method of solving the plane problem of plastic flow is briefly summarized. In Sec. 2, various types of slip lines and

13. *Metals—Mechanical Properties and Tests*

their features are thoroughly discussed. Sec. 3 gives some examples of application of the mathematical theory of plasticity to plastic working of metals in manufacturing processes, such as wire drawing, rolling, extrusion, and ironing of metal cups.

13286* Studies in Zinc-Base Die Casting Alloys. (Japanese) Masao Kato. *Report of the Institute of Industrial Science, University of Tokyo*, v. 1, no. 9, Mar. 1951, p. 274-303.

The alloy system used so far universally as Zn-base die-casting alloys are Zn-Al and Zn-Al-Cu. Since Cu-containing alloys have the disadvantage of embrittlement due to aging, the author believes that, in the future, more attention should be given to Zn-Al alloys. Presents results of a comprehensive study on mechanical properties and corrosion resistance of the different compositions, including effects of impurities such as Pb, Cd, Mg, and Fe. Similar experiments were made on permanent-mold and die castings. Solution attack of molten alloys on ferrous metals was also studied. Numerous graphs and micrographs. 30 ref.

13287 Intercrystalline Cracking of Metals. J. Neill Greenwood. *Bulletin of the Institute of Metals*, v. 1, Aug. 1952, p. 104-105. (Bound with *Journal of the Institute of Metals*, v. 80, Aug. 1952.); *Journal of the Iron and Steel Institute*, v. 171, Aug. 1952, p. 380.

A model is used as an aid in explaining mechanism of the above. Conditions necessary appear to be increased temperature and decreased rate of strain.

13288 Cross-Slip in Aluminium and α-Brass. Robert Maddin. *Bulletin of the Institute of Metals*, v. 1, Aug. 1952, p. 105-106. (Bound with *Journal of the Institute of Metals*, v. 80, Aug. 1952)

Summarizes previous findings in above work. Micrographs.

13289 Low-Stress Torsional Creep Properties of Pure Aluminium. *Bulletin of the Institute of Metals*, v. 1, Aug. 1952, p. 106-108. (Bound with *Journal of the Institute of Metals*, v. 80, Aug. 1952)

Two Letters to the Editor (by T. Ll. Richards and D. E. Yeomans, and by A. J. Kennedy) critically discuss some recent results reported in the literature. Kennedy points out that the results reported are not irreconcilable with the behavior of fairly simple models. Graphs. 10 ref.

13290 Twin Accommodation in Zinc. P. L. Pratt and S. F. Pugh. *Journal of the Institute of Metals*, v. 80, Aug. 1952, p. 653-658.

A study of plastic deformation of single crystals of Zn was made, using opaque-stop and x-ray microscopic techniques to examine cleavage faces. Stresses arising from twinning shear are shown to be relieved by accommodation kinking. Diagrams. 10 ref.

13291 The Creep and Softening Properties of Copper for Alternator Rotor Windings. *Journal of the Institute of Metals*, v. 80, Aug. 1952, p. 682-683.

Discussion of paper by N. D. Benson, J. McKeown, and D. N. Mends.

13292* Extension of the Simple Plastic Theory to Take Account of the Strain-Hardening Range. J. W. Roderick and J. Heyman. *Institution of Mechanical Engineers, Proceedings* (Applied Mechanics Div.), v. 165, W.E.P. 67, 1951, p. 189-197.

Describes experiments in which 4 steels were tested for tension, and stress-strain relations through the plastic range. Information gave support to theoretical work, in which behavior of these steels in flexure can be correlated with the tensile properties. Diagrams, graphs, and tables.

13293 Instrumentation for a Precision Creep-Testing Laboratory. Joe Lundholm, Jr. *Instruments*, v. 25, Aug. 1952, p. 1096-1101; *I.S.A. Journal*, v. 8, Aug. 1952, p. 94-99.

Described, diagrammed, and illustrated.

13294* Ship Structural Members. Part V. A. G. Hadjispyrou and H. Lackenby. *Transactions of the Institution of Engineers & Shipbuilders in Scotland*, v. 95, pt. 7, 1951-52, p. 563-598; disc., p. 598-608.

Results are given of further investigations on strength and stiffness of the above. These include tests on rolled steel sections 9 and 12 in. in depth, in association with plating. Effect of the following variables was investigated; various shapes of section both riveted and welded; different types and sizes of end connections both bracketed and unbracketed; cutting of scallops of different depths in the webs of welded stiffeners; and cutting of slots in the webs of riveted stiffeners.

13295 Metals Can Be Softened By Cold Work. N. H. Polakowski. *Iron Age*, v. 170, Aug. 28, 1952, p. 106-111.

See abstract of "Softening of Metals During Cold Working", *Journal of the Iron and Steel Institute*, v. 169, Dec. 1951, p. 337-346.

13296 Austenitic Cast Stainless Good for Low Temperature Applications—But. J. W. Juppenlatz. *Iron Age*, v. 170, Sept. 4, 1952, p. 147-151.

Shows that full austenitic structure or low magnetic permeability is not a guarantee of high impact strengths at low temperatures. Although welding of some grades does not seriously affect low-temperature properties, postweld solution treatment is shown to be advisable for improved corrosion resistance. Comparative mechanical properties are charted.

13297* How Good is the Charpy Impact Test? C. A. Penrose. *Iron Age*, v. 170, Sept. 11, 1952, p. 143-147.

To determine reliability of the above test and its reproducibility, steels of 150,000-160,000 psi. yield strength, having impact strength of 20-30 ft.-lb. were tested at −40°F. Within these limits and only for this set of conditions the Charpy "V" notch test is reliable. Photomicrographs, diagrams, and tables.

13298 Factors Influencing the Creep Resistance of Wrought Carbon Steels. C. H. M. Jenkins and H. J. Tapsell. *Journal of the Iron and Steel Institute*, v. 171, Aug. 1952, p. 359-371.

Summarizes work on creep properties of above carried out for the Electrical Research Assn. at the National Physical Laboratory between 1929 and 1948. It includes a discussion on the influence of a number of manufacturing variables and other metallurgical factors on the creep rate, with particular reference to steels having abnormally high creep rates. Tables, graphs, photomicrographs. 22 ref.

13299 Anelasticity of Zinc. Shuichiro Takhashi. *Journal of Applied Physics*, v. 23, Aug. 1952, p. 866-868.

Investigation of above using bars vibrating transversely at audio frequencies in the "free-free" modes. With these specimens, a discontinuous phenomenon which is supposed to be closely correlated with slips occurring in the crystal was found.

13300 Influence of Chemical Composition on the Rupture Properties of 1200°F. of Wrought Cr-Ni-Co-Fe-Mo-W-Cb Alloys. E. E. Reynolds, J. W. Freeman, and A. E. White. *Journal of Metals*, v. 4, Sept. 1952; *Transactions of American Institute of Mining and Metallurgical Engineers*, v. 194, 1952, p. 946-958.

Investigation results are given for 63 modifications of Cr-Ni-Co-Fe-base alloys at 1200°F. Melting, fabrication, and heat treatment were kept constant. Micrographs, tables, and graphs. 17 ref.

13301 Creep Correlations in Alpha Solid Solutions of Aluminum. Oleg D. Sherby and John E. Dorn. *Journal of Metals*, v. 4, Sept. 1952; *Transactions of American Institute of Mining and Metallurgical Engineers*, v. 194, 1952, p. 959-964.

Describes materials, equipment, technique, results, and validity of results of study to determine secondary creep rates and temperatures for correlations between creep and tensile data on basis of the Zener-Hollomon relationship. Diagrams and tables. 11 ref.

13302 Some Observations of Subgrain Formation During Creep in High Purity Aluminum. Italo S. Servi, John T. Norton, and Nicholas J. Grant. *Journal of Metals*, v. 4, Sept. 1952, *Transactions of American Institute of Mining and Metallurgical Engineers*, v. 194, 1952, p. 965-971.

Coarse grained high-purity aluminum was tested in creep at

temperatures of 400-1200°F. to develop subgrain structures. Measurements of subgrain size, distribution, and rotation were made from x-ray diffraction patterns. Micrographs and tables. 20 ref.

13303 Materials for Springs for Use at Elevated Temperatures. *Mainspring*, v. 14, Aug. 1952, 4 pages.

Results of experimental study of various spring materials at temperatures from 250 to 700°F. are charted and discussed. Initial stress is plotted against per cent loss of load at various temperatures for oil-tempered valve-spring wire, for SAE-160 and 9254 steels, for Type 302 18-8 stainless, and for 18-4-1 high-speed steel.

13304 New High Temperature Alloy. *Materials & Methods*, v. 36, Aug. 1952, p. 98-99.

Deals with mechanical and fabrication properties and applications of Hastelloy X, a new alloy which contains no cobalt. Nominal composition is 45 Ni, 22 Cr, 9 Mo, 0.15 C, and 24 Fe. Tables and graphs.

13305* The Hardness of Metals. (Dutch.) M. J. Druyvesteyn and M. A. Meyer. *Metalen*, v. 7, June 30, 1952, p. 203-206; July 15, 1952, p. 220-222.

Some results of the 2nd author which were published in his thesis are summarized. A discussion is given of commonly used hardness numbers (Brinell, Meyer, Vickers, and Rockwell). Special attention is paid to their interpretation and to dependence on the true stress-strain curve of the metal to be tested. The effect of cold-work is discussed quantitatively. A general discussion of the hardness of single-phase alloys, with new experimental results on some Ni alloys, is given. Factors determining the hardness of heterogeneous alloys, both annealed and chill-cast, are discussed. 26 ref.

13306 New Magnesium Alloy. *Metal Industry*, v. 81, Aug. 29, 1952, p. 169-170.

Mechanical properties are tabulated and graphed for Magnesium Elektron Limited's new alloy, Elektron ZTl. It is a Mg-Zr-Zn-Th alloy recommended for use in castings for the range 250-350°C. Developed for jet engines. Has high creep and fatigue resistance.

13307* The Creep Behavior of Some Nonferrous Metals and Their Alloys. (German.) K. Löhberg, *Metall*, v. 6, Aug. 1952, p. 446-450.

Dependence of creep behavior of metals on fusion temperature and lattice structure was studied. Results of experiments on Pb, Cu, Al, Mg, Zn, and their alloys are charted and discussed.

13308* Notched-Bar Impact Test and Various Embrittling Factors. (French.) Gilbert Remy. *Métaux: Corrosion—Industries*, v. 27, June 1952, p. 245-264.

Presents extensive analysis of experimental and theoretical work on the above. Discussion of the various factors involved is taken up systematically, under a series of main and subheadings. Finally the possibility of generalization of the laws of plastic deformation is discussed. Includes numerous graphs taken from the literature. 46 ref.

13309* Physical Principles of Creep. (French.) P. Laurent. *Métaux: Corrosion—Industries*, v. 27, June 1952, p. 265-273.

Critically discusses literature on deformation by creep, behavior of metal during creep, and rupture by creep and their principles. Data from the literature are charted and tabulated.

13310* Stress and Deformation During Cyclic Loading. (Russian.) Iu. N. Rabotnov. *Prikladnaia Matematika i Mekhanika*, v. 16, Jan.-Feb. 1952, p. 121-122.

A brief mathematical analysis.

13311* Use of Magnetic Method for Checking the Hardness of Hardened Parts. (Russian.) N. A. Gutsula. *Promyshlennaia Energetika*, v. 9, Jan. 1952, p. 18.

Describes a magnetic hardness tester. Circuit diagrams.

13312 A Torsion Pendulum of Improved Design for Measuring Damping Capacity. James W. Jensen. *Review of Scientific Instruments*, v. 23, Aug. 1952, p. 397-401.

Describes construction of above with an improved method of alignment which minimizes friction losses. Photographs.

13313* The Physics of the Deformation of Metals. (French.) E. N. da C. Andrade. *Revue de Métallurgie*, v. 49, July 1952, p. 469-484.

Describes a series of experiments concerning the mechanical properties of pure and semi-pure metals. Diagrams, graphs, and micrographs.

13314* The Fatigue of Metals. (French.) M. Ros. *Revue de Métallurgie*, v. 49, July 1952, p. 497-510.

Diagrams and discusses application of the Coulomb-Mohr theory to interpretation of the problem of fracture of metals in general. Macrographs.

13315* Creep Tests for the Acceptance of Nimonic Alloys for Gas Turbines. (French.) C. W. Weaver. *Revue de Métallurgie*, v. 49, July 1952, p. 511-522; disc., p. 522-523.

Describes a new laboratory for the above, arrangement of the apparatus, operation of the individual machines, electrical control devices, construction of the furnace, and regulation of the temperature. Diagrams and photographs.

13316* Photoelastic Investigation of New Girder Shapes Welded From Sheet Metal. (German.) R. Albrecht. *Schweissen und Schneiden*, v. 4, Aug. 1952, p. 277-279.

Describes and diagrams above. Results are indicated and tabulated; their practical application is outlined. Photographs.

13317* Discussion of Fatigue Strength of Notched Pieces. (German.) M. Russenberger. *Schweizer Archiv für angewandte Wissenschaft und Technik*, v. 18, July 1952, p. 220-227.

Presents fundamental analysis of design of pieces having elements which reduce strength, such as threads, holes, sharp corners, as well as inclusions, which have a similar effect. Shows that damping is responsible to a large extent for notch sensitivity. Characteristics of the damping, and especially its variability during the fatigue stressing are pointed out.

13318* The Applicability of Technical Methods of Measuring Internal Stresses in Metallic Workpieces. (German.) Hans Bühler. *Stahl und Eisen*, v. 72, July 31, 1952, p. 947-952.

Different measuring methods developed using specimens of ring, disc or strip shape and their applicability. Advantages and disadvantages of stress measurements on cores bored out of solid and hollow workpieces. Application of extension measurement strips for measuring total internal stresses in solid and hollow cylinders. 29 ref.

13319* Converter Steel Refined With Pure Oxygen and Its Properties. (German.) Wolfgang Kühnelt. *Stahl und Eisen*, v. 72, Aug. 14, 1952, p. 1004-1010.

Segregation conditions, nonmetallic inclusions, and density of ingots. Hot- and cold-forming properties, ductility of wire, deep drawability of sheet and strip, tensile strength, notched-bar impact strength, workability, weldability, hardenability, creep strength, etc. Graphs.

13320* Properties of Steels Refined in the Converter by Blowing Pure Oxygen From the Top. (German.) Hubert Hauttmann. *Stahl und Eisen*, v. 72, Aug. 14, 1952, p. 1011-1018, disc., p. 1019-1024.

Results of comprehensive tests on 12 test melts of variable composition. Tensile and impact strength, weldability, cupping, corrosion resistance, electrical properties, and magnetic properties were studied. Numerous graphs and tables.

13321 Sub-Zero Strain Aging Affects Iron Properties. *Steel*, v. 131, Sept. 1, 1952, p. 86-87.

Relative proportions of strain aging and hardening at the various temperatures for 5 conditions of ingot iron were determined on basis of known tendencies of 2 types of work hardening to increase or decrease these properties with temperature.

13322 High-Duty Irons Reduce Costs. C. E. Herington. *Steel*, v. 131, Sept. 15, 1952, p. 94-96.

Discusses above citing advantages of high-strength irons with respect to wear resistance, ability to stand up under heat, and ability to withstand repeated impact. Applications in rolls, dies, and jigs are described and illustrated.

13. *Metals—Mechanical Properties and Tests*

13323* Brittle Fracture of Crystallized Substances as a Surface Phenomenon. (German.) M. Schreckenbach. *Technik*, v. 7, Feb. 1952, p. 65-73.

After critically discussing inadequacy of orthodox explanation of brittle fracture, it is shown that fracture occurs when the energy required to form a fracture surface is available in a plastically transmittable manner, and that fracture occurs as soon as this energy has become great enough. 60 ref.

13324* Research on the Bursting Strength of Safety Discs. (German.) Hans Biegler. *Technik*, v. 7, Feb. 1952, p. 74-76.

Research results on pressure- and temperature-safety discs are discussed. Stressed and ruptured discs of various materials, including gray cast iron, are illustrated.

13325* Wire for Pre-Stressed Concrete. B. M. Pearson. *Wire Industry*, v. 19, Aug. 1952, p. 737-738, 741-742, 761.

Indicates requirements for materials used in the stressing, including technical advantages of pre-stressed concrete, metallurgical requirements of steel used, wire-rope elongation, minimum bend radius, end anchorages, relaxing in the rope heads, and use of a concrete casting.

13326* Computation and Experimental Testing of the Strength Properties of Automotive Parts. (German.) Heinz Glaubitz. *Zeitschrift des Vereines Deutscher Ingenieure*, v. 94, July 21, 1952, p. 715-719.

Discussion of strength properties of individual stressed automobile parts and testing methods includes charts and graphs. 25 ref.

13327* Stress-Optical Investigation of Plates by a Two-Layer Process. (German.) A. Kuske. *Zeitschrift des Vereines Deutscher Ingenieure*, v. 94, Aug. 1, 1952, p. 745-747.

Discusses a modification of the photoelastic method of determining bending stresses of plates. Photographs and graphs. 19 ref.

13328* The High Ductility State of Aluminum-Zinc-Base Alloys. Part II. (German.) Heinz Mitbauer and Franz Sauerwald. *Zeitschrift für Metallkunde*, v. 43, July 1952, p. 244-249.

The relationship between ductility and segregation effects of conditions of casting and of degree of dispersion upon ductility, the β_2 disintegration, and physical properties were investigated at low temperatures. Proposes an interpretation of the origins of high ductility. Data are tabulated and charted. Micrographs.

Miscellaneous Publications

13329 Creep-Rupture and Recrystallization of Monel From 700 to 1700°F. Nicholas J. Grant and Albert G. Bucklin. American Society for Metals, Preprint 5, 1952, 20 pages. (TS300 Am35p)

Extensive creep-rupture tests were made on wrought Monel at temperatures from 700-1700°F. and for rupture times from about 0.001 to 2700 hrs. Tests were made on annealed, 30% cold-worked, and 75% cold-worked structures. Recrystallization data were obtained for Monel cold-worked from 4 to 70% and annealed from 0.5 to 500 hrs. at temperatures from 800 to 1700°F. Correlation of recrystallization data from static tests with hardness changes and equicohesion values from stress-rupture tests was attempted. Experimentally determined values of equicohesion are given for 30% cold-worked Monel.

13330 Influence of Grain Size on High Temperature Properties of Monel. Paul Shahinian and Joseph R. Lane. American Society for Metals, Preprint 6, 1952, 22 pages. (TS300 Am35p)

Specimens of two heats were tested in creep-rupture at 700, 900, 1100, and 1300°F. and at stresses ranging from 7000 to 65,000 psi. Grain sizes, which ranged from 0.024 to 0.78 mm. average diam. were obtained by cold work and recrystallization. Time-to-rupture, minimum creep rate, total elongation, and reduction-in-area curves were drawn showing their relationship to grain size. 16 ref.

13331 Creep and Rupture of Chromium-Nickel Austenitic Stainless Steels. E. J. Dulis, G. V. Smith, and E. G. Houston. *American Society for Metals*, Preprint 7, 1952, 35 pages. (TS300 Am35p)

Supplementing results previously reported, creep and rupture test data are presented for AISI Grades 304L, 304L (high N) 316L, 316Cb, and 303; test results of additional heats of 304, 321, and 347 are also given. Observed changes in microstructure and in certain room-temperature mechanical properties brought about by creep-test exposure are described.

13332 Effect of Carbon Content on 18-4-1 High Speed Steel. Arthur H. Grobe and George A. Roberts. *American Society for Metals*, Preprint 15, 1952, 17 pages. (TS300 Am35p)

Complete hardness data, for hardening and tempering are reported for five 18-4-1 high-speed steels with C contents varying from 0.52 to 0.78% and one steel with 0.57% C and 1.21% V. The steels were austenitized for 0.1-300 min. at 1800-2350°F. Data on effect of austenitizing time and temperature on oil-quenched hardness are presented as iso-hardness lines on time-temperature plots for each steel. Tempering data are recorded as master tempering curves where hardness is plotted against tempering parameter for each austenitizing temperature for every steel. Unnotched Izod impact tests were made using 5 steels oil-quenched from 2200°F. and 3 steels from 2350°F.

13333 Temperature Dependence of the Hardness of Pure Metals. J. H. Westbrook. American Society for Metals, Preprint 17, 1952, 23 pages. (TS300 Am35p)

The literature covering the hardness of pure metals as a function of temperature is reviewed and some generalizations made. These led to an approximate method for calculating hardness of a pure metal as a function of test temperature, crystal structure, specific heat, and heats of fusion and transformation. The method has approximate validity from near absolute zero to about half the absolute melting point. 50 ref.

13334 Hardness of Various Steels at Elevated Temperatures. F. Garofalo, P. R. Malenock, and G. V. Smith. American Society for Metals, Preprint 18, 1952, 18 pages. (TS300 Am35p)

A hot-hardness tester of the static-loading type is described and testing techniques developed are discussed. A number of different steels, including various types of 18 Cr-8 Ni stainless, plain-carbon steels and an 8 Cr + 1 Mo steel, were tested at temperatures ranging from room temperature to 1500°F. The results appear to indicate a general relation between hot hardness and creep- or creep-rupture strength, which, to a first approximation, is independent of structure or test temperature. A similar relation was observed between hot hardness and ultimate tensile strength in short-time hot-tensile tests. 16 ref.

13335 Some Properties of a Nodular Iron at Elevated Temperatures. M. S. Saunders and M. J. Sinnott. American Society for Metals, Preprint 19, 1952, 12 pages. (TS300 Am35p)

Short-time tensile data over the range 800-1200°F. are presented for a typical nodular iron in 2 conditions: as-cast and partially annealed. Elevated-temperature impact data for various exposure times over the same range are presented. Stress-rupture data at 1200°F. for the iron in both conditions are included. Comparison is made with the same properties of killed carbon steel and with C-Mo steel.

13336 Accelerated Strain Aging of Commercial Sheet Steels. L. R. Shoenberger and E. J. Paliwoda. American Society for Metals, Preprint 20, 1952, 15 pages. (TS300 Am35p)

Effect of natural strain aging on hardness and tensile characteristics of some rimmed and stabilized steels was determined. Variations in behavior of rimmed steels are ascribed principally to ferrite grain size and degree of skin rolling. In strain aging of Al-killed and V-rimmed steels, the N not combined with Al or V assumes an important position as shown by its relationship to proportional-limit changes. An accelerated strain-aging test using gradient heating was developed to predict the course of age hardening and to estimate rate and severity of yield-point return during aging. 11 ref.

13337 X-Ray Measurement of Residual Stress in Hardened High Carbon Steel. A. L. Christenson and E. S. Rowland. American Society for Metals, Preprint 22, 1952, 29 pages. (TS300 Am35p)

An x-ray method is described for measurement of macro or

engineering stress in hardened high-carbon steel. The method is described in detail and applied to measurement of O.D. surface stress in carburized and hardened rings of SAE-4620 steel with heat-treated, ground, and electrolytically polished surfaces.

13338 The Endurance Limit of Temper-Brittle Steel. R. D. Chapman and W. E. Jominy. American Society for Metals, Preprint 23, 1952, 12 pages. (TS300 Am35p)

Presents results of an investigation of effect of temper brittleness of an SAE-5140 steel on endurance limit at both room temperature and at 35°F. 3 different heat treatments were applied. Both polished and notched bars were tested in fatigue at room and subzero temperatures. In addition, tensile and standard V-notch Charpy impact specimens were tested at the same temperatures. 15 ref.

13339 Plastic Stress-Strain Relations of Alcoa 14S-T6 for Variable Biaxial Stress Ratios. Joseph Marin, L. W. Hu, and J. F. Hamburg. American Society for Metals, Preprint 24, 1952, 22 pages. (TS300 Am35p)

Three types of biaxial stress tests were conducted: constant-stress-ratio tests and 2 types of variable-stress-ratio tests. Main object of the study, however, was not to report on the constant-stress-ratio tests, but to determine validity of the flow-type theory in prediciting plastic stress-strain relations under combined stresses. Data are charted and tabulated.

13340 Effect of Hardness on the Level of the Impact Energy Curve for Temper Brittle and Unembrittled Steel. Frank L. Carr, Manuel Goldman, Leonard D. Jaffe, and Donald C. Buffum. American Society for Metals, Preprint 26, 1952, 5 pages. (TS300 Am35p)

Specimens of martensitic SAE-3140 steel were tempered for short times at several temperatures between 500 and 675°C. to give various hardnesses ranging from Rockwell C-20½ to C-38. Comparisons of energy levels in the V-notched Charpy test were made at 200°C. above the temperature of transition from ductile to brittle failure. A linear relationship between impact-energy level and hardness was found in the hardness range Rockwell C-27 to at least C-38.

13341 Transverse Mechanical Properties in an SAE 1045 Forging Steel. Arthur H. Grobe, Cyril Wells, and Robert F. Mehl. American Society for Metals, Preprint 27, 1952, 34 pages. (TS300 Am35p)

Tensile-test data for specimens from a high-quality SAE forging steel were accumulated and analyzed statistically. Specimens were cut from the original ingot and from forgings reduced 2 to 1, 4 to 1, and 10 to 1. Approximately 60 transverse or 10 longitudinal values per each property investigated constituted a sample. The investigation included a study of tensile properties associated with 2 pearlite and ferrite structures—annealed and air-cooled—and 4 quenched and tempered structures—quenched to martensite and tempered at 750, 950, 1100, and 1250°F. Effect of angle of test from transverse to longitudinal direction on tensile properties was determined for 10-1 reduction for specimens in the annealed and quenched and tempered state. Tensile-test data are presented for commercial forgings.

13342 The Determination of the Elastic Constants of Metals by the Ultrasonic Pulse Technique. Myron B. Reynolds. American Society for Metals, Preprint 28, 1952, 15 pages. (TS300 Am35p)

Above technique was used to determine Young's modulus, shear modulus, and Poisson ratio of Be, Cb, Zr, Ti, V, Th, U, α-brass, and Type 347 stainless steel. Relationships between elastic wave velocities and elastic constants are given for the case of an isotropic solid. Elastic wave propagation and reflection are treated briefly. The technique and apparatus is described and computation of wave velocities illustrated. The elastic moduli obtained are tabulated and discussed.

13343 Mechanical Properties and Strain Aging Effects in Titanium. R. D. Rosi and F. C. Perkins. American Society for Metals, Preprint 29, 1952, 20 pages. (TS300 Am35p)

Tensile properties of Ti of commercial purity were investigated between 77 and 925°K. at constant strain rates of 0.003 and 0.138 min. Results of these tests showed that this material exhibits the usual mechanical effects associated with strain aging. Some observations were made on the nature of Lüders' bands in an extended, coarse-grained sheet specimen. 16 ref.

13344 Mechanical Properties, Including Fatigue of Titanium-Base Alloys RC-130-B and Ti-150-A At Very Low Temperatures. S. M. Bishop, J. W. Spretnak, and M. G. Fontana. American Society for Metals, Preprint 31, 1952, 14 pages. (TS300 Am35p)

Above alloys were subjected to tensile, fatigue, impact, hardness, and dilatometric tests at low temperatures. Data are reported for: tensile and fatigue at 77, −108, and −321°F.; impact and hardness at 77, −108, −197, −321, and −423°F.; and expansion from room temperature to −321°F. Describes apparatus and techniques.

13345 A Study of the Mechanism of the Delayed Yield Phenomenon. T. Vreeland, Jr., D. S. Wood, and D. S. Clark. American Society for Metals, Preprint 33, 1952, 13 pages. (TS300 Am35p)

Presents results of an experimental investigation of behavior of an annealed low-carbon steel subjected to a rapidly applied constant stress and to repeated short-duration stress-pulses. Effect of time of aging on number of stress-pulses to induce yielding was determined. Effects observed are discussed in terms of the dislocation theory of yielding. 16 ref.

13346 Properties of Some Hydrogen-Sintered, Binary Molybdenum Alloys. W. L. Bruckhart, M. H. LaChance, C. M. Craighead, and R. I. Jaffee. American Society for Metals, Preprint 36, 1952, 25 pages. (TS300 Am35p)

From a study conducted on alloys representing 18 different binary types, data are presented showing effects of these additions on fabricability, room-temperature, mechanical properties, and hot hardness to 800°C. Results indicate that Al, Co, Cr, Fe, Si, and W are most effective alloying additions.

13347 The Effect of Dispersions on the Tensile Properties of Aluminum-Copper Alloys. R. B. Shaw, L. A. Shepard, C. D. Starr, and J. E. Dorn. American Society for Metals, Preprint 37, 1952, 23 pages. (TS300 Am35p)

The plastic properties were correlated with mean free path between the hard $CuAl_2$ particles dispersed in the α solid solution phase. True stress-true plastic strain curves for the various dispersions formed a homologous series, yield strength and the rate of strain hardening increasing uniformly with decreasing mean free path. These results were found to be valid from 78 to 295°K. and for compositions of 3, 4, and 5% Cu in high-purity Al.

13348 Some Properties of High Purity Zirconium and Dilute Alloys With Oxygen. R. M. Treco. American Society for Metals, Preprint 38, 1952, 19 pages. (TS300 Am35p)

A systematic investigation was made of the physical and mechanical properties of dilute alloys of oxygen in high-purity iodide-refined Zr. A marked strengthening effect was observed as a result of O_2 additions. Results of tensile tests at elevated temperatures up to 400°C. are also presented. Preparation of alloys is discussed in detail. 14 ref.

13349 Recent European Work on Mechanical Properties of Metals at Low Temperatures. N. P. Allen. National Bureau of Standards, "Mechanical Properties of Metals at Low Temperatures", Circular 520, 1952, p. 1-34; disc., p. 34-35. (TA460 Un3m)

Elasticity and plasticity are dealt with, and development of brittleness at low temperatures is discussed in relation to brittle fracture in mild steel, behavior of heat-treated alloy steels at temperatures prevailing in the stratosphere, and reliability of austenitic steels at liquid-air-temperature. Properties at low temperatures of pure alloys of iron made at the National Physical Laboratory are described, and it is shown that some alloying additions exert influence on resistance to plastic deformation. 29 ref.

13350 Development and Application of Chromium-Copper-Nickel Steel for Low-Temperature Service. Walter Crafts and C. M. Offenhauer. National Bureau of Standards, "Mechanical Properties of Metals at Low Temperatures", Circular 520, 1952, p. 48-63; disc., p. 63-66. (TA460 Un3m)

An economical low-alloy Cr-Cu-Ni steel designed for service at low temperatures has been used successfully for many years in chemical-plant fabrication and has consistently been suitable for use at −80°C. Several heats have been applied at −100°C. Experimental studies under laboratory conditions and observa-

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tions of commercial heats suggest that a most significant and immediately applicable improvement would result from increase in the Al content above the amount required for grain refinement to a level of 0.10-0.20%. Mechanical properties are tabulated and charted.

13351 Tensile Properties of Copper, Nickel, and Some Copper-Nickel Alloys at Low Temperatures. Glenn W. Geil and Nesbit L. Carwile. National Bureau of Standards, "Mechanical Properties of Metals at Low Temperatures", Circular 520, 1952, p. 67-93; disc., p. 93-96. (HA460 Un3m)

Tension tests were made at −196, −140, −78, −30, +25 and +100°C. on high-conductivity Cu, cupronickel, 70% Ni +30% Cu alloy, and Ni in the annealed condition. True stress-strain curves were determined from numerous simultaneous load and diameter measurements made during the course of each test to fracture. Graphs show influence of test temperature and chemical composition on mechanical properties and work-hardening characteristics. Effect of solute content of the alloys on initial strength, ultimate tensile stress, and on true stress and true strain at maximum load and at fracture is briefly discussed. 14 ref.

13352 Application of Metals in Aircraft at Low Temperatures. J. B. Johnson and D. A. Shinn. National Bureau of Standards, "Mechanical Properties of Metals at Low Temperatures", Circular 520, 1952, p. 97-109; disc., p. 109-111. (HA460 Un3m)

Discusses briefly the relationship of properties of metals as determined by conventional laboratory tests and those selected by designer. Additional data on test of aircraft metals at temperatures down to −420°F. are presented. Recommends that evaluation of serviceability of material at low temperatures not be based on transition from tough to brittle fracture as represented by results of notched-bar impact tests, as this may mean selection of steel with a higher content of strategic alloying elements than is necessary for the specific application. 14 ref.

13353 Properties of Austenitic Stainless Steels at Low Temperatures. V. N. Krivobok. National Bureau of Standards, "Mechanical Properties of Metals at Low Temperatures", Circular 520, 1952, p. 112-134; disc., p. 135-136. (HA460 Un3m)

Presents study and summary of published and unpublished information on strength characteristics of austenitic stainless steels at various subzero temperatures. Effect of composition on mechanical properties at room and subzero temperatures, calculations of true strength from test results, and influence of heat treatments, especially those that might result either in carbide precipitation or sigma formation, on mechanical properties at low temperatures are discussed in some detail. The beneficial influence of extra low carbon content is presented. Data on modulus of elasticity, fatigue, impact, tensile impact, effect of notches, distribution of ductility at the notch, and the beneficial effects of low temperature on ductility characteristics are summarized and appraised. 18 ref.

13354 Dimensional Effects in Fracture. C. W. MacGregor and N. Grossman. National Bureau of Standards, "Mechanical Properties of Metals at Low Temperatures", Circular 520, 1952, p. 137-150; disc., p. 150-152. (HA460 Un3m)

Previously abstracted from *Welding Journal*, v. 31, Jan. 1952, p. 20S-26S.

13355 Mechanical Properties of High-Purity Iron-Carbon Alloys at Low Temperatures. R. L. Smith, G. A. Moore, and R. M. Brick. National Bureau of Standards, "Mechanical Properties of Metals at Low Temperatures", Circular 520, 1952, p. 153-179; disc., p. 179. (HA460 Un3m)

Natural stress-strain data were obtained at temperatures from 23 to −185°C. on 4 high-purity Fe-C alloys combining 0.05-0.49% C. Conclusions resulting from analysis of the data are summarized.

13356 Brittle Fractures in Ship Plates. Morgan L. Williams. National Bureau of Standards, "Mechanical Properties of Metals at Low Temperatures", Circular 520, 1952, p. 180-204; disc., p. 204-206. (HA460 Un3m)

Principal factors contributing to structural failures of welded ships and preventive measures that have been applied are discussed. Statistical interpretation of data obtained from laboratory investigations of 113 plates removed from fractured ships indicates that probability of fracture starting in plate increases markedly with increasing notch sensitivity as measured by the 15 ft. lb. transition temperature of Charpy V-notch specimens. 12 ref.

13357 New Method of Investigating Plastic Deformation of Ferromagnetic Crystals. N. S. Akulov and N. Z. Miryasov. Henry Brutcher, Translation 2735, 8 pages. (From *Zhurnal Tekhnicheskoi Fiziki*, v. 18, Mar. 1948, p. 389-394.)

Previously abstracted from original.

13358 Observations on 885°F. Embrittlement in Ferritic Stainless Steel. C. A. Zapffe, C. O. Worden, and R. L. Phebus. Henry Brutcher, Translation 2832, 28 pages. (From *Stahl und Eisen*, v. 71, no. 3, 1951, p. 109-119.)

Review of 885° embrittlement; new bend test; bendability results; fractographic study; effect of annealing; effect of 885°F. embrittlement on fracture; and theory of Cr protoxide as cause. Diagrams and fractographs. 39 ref.

13359 Mechanical Properties of Low-Alloy Heat Treating Steel Improved by Proper Adjustment of Heat Treating Temperatures and Times. W. Eilender, H. Arend, and W. Neuhaus. Henry Brutcher, Translation 2881, 12 pages. (From *Archiv für das Eisenhüttenwesen*, v. 23, Jan.-Feb. 1952, p. 67-72.)

Previously abstracted from original.

13360 Influence of Increased Silicon or Manganese Contents on the Properties of 10 and 14-Ton Forging Ingots of Basic Open-Hearth Steel. W. Meisemeyer. Henry Brutcher, Translation 2895, 12 pages. (Condensed from *Stahl und Eisen*, v. 71, Jan. 4, 1951, p. 8-15; disc., p. 15.)

Previously abstracted from original.

13361 Potential Applications of Boron-Treated Steels. A. Dammer and E. Theis. 4th International Mechanical Engineering Congress, June 1952, 15 pages.

Reports a series of basic tests made in Germany on boron steels. Tests covered: deoxidizing and denitriding conditions; influence of increasing amounts of Mn, Cr, Mo, and Ni on hardening characteristics of B-free and B-alloyed grades of carburizing and heat-treatable steels; mechanical properties and hardness. Applicability of B steels is discussed. Tables and numerous graphs.

13362 Use of the Principle of Raising the Elastic Limit of Steels by Strain Hardening and Artificial Aging for Constructon of Penstocks, and Savings Resulting From It. (French.) M. Georges Ferrand. 4th Internationl Mechanical Engineering Congress, June 1952, 30 pages.

Exposition of above, well-illustrated with diagrams and photographs. Tabulated mechanical properties. Details of calculations are given in appendixes.

13363 Resistance to Wear of Copper and Copper Alloys. Olof Hindbeck. 4th International Mechanical Engineering Congress, June 1952, 5 pages.

Resistance to mechanical wear for 10 different Cu alloys was studied by having a rotating steel wheel rub with constant load and varying testing times against the flat ground surface of test bars. Table and graph. 10 ref.

13364 The Time Stability of High-Temperature Steels. H. Holdt. 4th International Mechanical Engineering Congress, June 1952, 11 pages.

Discussion and experimental data on the above. Graphs and tables show results of long-time creep tests with Cr-Ni-Mo steel; ultimate stresses and elongations after rupture during long-time creep tests (tension) for Cr-Ni-Mo, Cr-Mo, and Cr-Mo-V steels; and constant creep-elongations due to tension or bending stresses of a Cr-Mo cast steel and a Cr-Mo-V-W steel. Photomicrographs of structure. Evaluation of short-time tests for providing information on long-time elevated temperature behavior.

13365 The Development of Steels for the Construction of Steam Boilers in Germany. Karl Kreitz. 4th International Mechanical Engineering Congress, June 1952, 24 pages.

General survey of above over the last 20 yrs. Tabular data on composition and mechanical properties of typical alloyed and unalloyed steels for the different periods for boiler and superheater tubes, saturated and superheated steam-collecting mains, boiler plates and drums, and for screws. 11 ref.

13366 Improved Basic Bessemer Steel. (French.) Robert Langers. 4th International Mechanical Engineering Congress, June 1952, 13 pages.

Reports upon a special Bessemer steel blown with a mixture of oxygen and superheated steam, and refined by use of a soda slag. It was found equivalent to openhearth steel. Tests showed excellent suitability for cold working plus notable strain-aging resistance. Furthermore, hardening by cold working, which results in an increase of brittleness, was generally less pronounced for oxygen-steam-blown double-slag treated Bessemer steel, than for openhearth steel. Mechanical properties graphed.

13367 The Influence of Silicon in Aluminium on Life of Cutting Tools. Hans Lindqvist. 4th International Mechanical Engineering Congress, June 1952, 12 pages.

A study of the wear of toolsteel when used on 4 Al-base alloys containing 0.35% Mg and 5, 10, 12.5, and 21% Si. Graphs and diagrams.

13368 The Creep of Some Non-Ferrous Metals and Their Alloys. K. Löhberg. 4th International Mechanical Engineering Congress, June 1952, 10 pages.

Previously abstracted from *Metall*, v. 6, Aug. 1952, p. 446-450.

13369 Possibilities for Further Improvement of High-Strength, Weldable Structural Steels. F. Nehl. 4th International Mechanical Engineering Congress, June 1952, 16 pages.

Extensive general discussion of structural steels covering mechanical properties in relation to structure and alloying elements; weldability; and post-weld mechanical properties. Development and mechanical properties of new Al steels suitable for welded construction. Development and properties of a Cu-Ni-Mo steel with excellent weldability, in contrast to other heat-treatable steels. Graphs.

13370 Results of Creep Tests on Steels at 500° up to 100,000 Hours. (German.) K. Richard. 4th International Mechanical Engineering Congress, June 1952, 31 pages.

Appearance and cause of brittle fractures at elevated temperatures. Long-time rupture tests. Long-time tensile strength and notch sensitivity of 11 steel types. Modification of testing steels for high-temperature service. Long-time yield limit, long-time damage limit, and long-time tensile-strength values for defining the properties of high-temperature materials. Graphitization. Damage to steels for high-temperature service caused by static load, and possibilities of their regeneration. Tables, graphs, and diagrams. 15 ref.

13371 Testing of Heavy Forgings for Steam Turbine Sets by Means of Core-Drilled Rods. R. Schinn. 4th International Mechanical Engineering Congress, June 1952, 15 pages.

Quality requirements of rotors which undergo a 2-min. spin test at 3750 r.p.m. Position of test samples in the forging. Special importance of above test-rods. Ultrasonic testing. Development of forging methods. Influence of C-segregation. Flakes. Strength of rotor core. Testing results of 15 rotors, with data on mechanical properties. Hardenability tests. Microstructure. Photographs, diagrams, and tables.

13372 Relationship of Test Results on Materials to Behavior of the Structural Part Under Service Conditions and on Its Characteristics During Shaping. (German.) E. Siebel. 4th International Mechanical Engineering Congress, June 1952, 7 pages.

Discusses especially: ultimate stress values, creep behavior, toughness, such technological properties as resistance to wear, and deformability in relation to noncutting shaping. Graphical data from the literature on soft iron and ingot steel.

13373 Mechanical Properties and Applications of Sintered Parts. H. G. G. Zapf. 4th International Mechanical Engineering Congress, June 1952, 16 pages.

Deals with structural parts under the headings: mechanical properties and production method; classification of sintered products; alloying techniques; and subsequent treatments. Data given for mechanical and physical properties of Fe and brass parts, especially in relation to production methods; mechanical properties of Cu and C steels; Fe-Cu equilibrium etc. Photographs, tables, and diagrams.

13374 Light Alloys for Use at Elevated Temperatures. (French.) J. Valeur. 4th International Engineering Congress, June 1952, 17 pages.

Experimental data obtained in the search for new alloys with better high-temperature mechanical properties. Comprises studies under varied conditions. Metals mentioned are Al, Cu, Mg, Ni, and Zr. Compares cast and wrought forms. Tables.

13375 Wear and Sliding Friction Properties of Nickel Alloys Suited for Cages of High-Temperature Rolling-Contact Bearings. I. Alloys Retaining Mechanical Properties to 600°F. II. Alloys Retaining Mechanical Properties Above 600°F. Robert L. Johnson, Max A. Swikert, and Edmond E. Bisson. National Advisory Committee for Aeronautics, Technical Notes 2758 and 2759, Aug. 1952, 30 and 29 pages. (TL570 Un3t)

In Part I, wear and sliding-friction properties of "L" nickel, wrought monel, cast modified "H" monel, cast "S" monel, Invar, Ni-Resist 3, and Nichrome V in contact with hardened SAE-52100 steel were studied. In Part II properties of cast Be-Ni, heat-treated Be-Ni, cast Inconel, Nimonic 80, Inconel X, Refractalloy 26, and Discaloy were studied in similar circumstances. Development of a naturally formed nickel oxide film produced good properties. Relative merits of the different materials are summarized. 22 ref.

Books

13376 Mechanical Properties of Metals at Low Temperatures. 206 pages. 1952. National Bureau of Standards, Washington. (Circular 520) (For sale by U. S. Govt. Printing Office, Washington) (TS460 Un3m)

A series of papers, abstracted separately.

See also:

13043 (steels for low-temperature service)
13065 (Ti and Ti alloys produced by Republic)
13079 (mechanical properties of drawn wires)
13090 (strength and tests of cold-rolled fillets)
13097 (wear resistance of cutting tools)
13105 (flow lines caused by drawing)
13110 (mechanical properties of sintered iron)
13115 (sintered Al—mechanical properties)
13120 (mechanical properties of sintered hard alloys)
13123 (mechanical properties of rolled metal powders)
13135 (mechanical properties of stainless tubing)
13138 (high-temperature strength of Cu stainless laminate)
13139 (cracking of low-alloy Mn-Mo steel welds)
13151 (notch-impact strength of tempered steels)
13176 (Zn effects on hardness of Cr electro deposits)
13183 (electro polishing vs. fatigue of steel and Al)
13204 (mechanical properties of Mo borides)
13205 (O_2 and N_2 vs. hardness of V)
13207 (mechanical properties of Be-Cu alloys)
13220 (hardness of Ti-O_2 alloys)
13231 (cold-work effects on sigma formation in stainless)
13244 (Young's modulus of new ferromagnetic alloy)
13262 (mechanism of friction and wear)
13377 (mechanical properties of Hastelloy D)
13568 (mechanical properties of Mg)
13570 (mechanical properties of Ni and Ni alloys)
13571 (mechanical characteristics of powder metallurgy parts)
13573 (mechanical properties of automotive steels)
13577 (mechanical properties of Cr-Fe castings)
13579 (fatigue strengths of bearing metals)
13580 (mechanical properties of alloy steels for jet engines)
13582 (mechanical properties of gray irons)
13583 (mechanical properties of Be and alloys)
13587 (mechanical properties of gray cast iron)

13. *Metals—Mechanical Properties and Tests*

13664 (wear in engines)
13725 (mechanical properties of self-lubricating bearings)
13731 (mechanical properties of couplings)
13733 (mechanical properties of high temperature alloys)
13745 (mechanical properties of steel in plastic range)

14. CORROSION

13377 Hastelloy Alloy D. Edward D. Weisert. *Chemical Engineering*, v. 59, Aug. 1952, p. 258, 260, 262, 264, 266-267.

Deals with corrosion resistance of above Ni-Si-Cu alloy to a number of corrosives, with data on mechanical properties and applications in the chemical process industries. Charts show corrosive effects of a wide variety of common chemicals.

13378 Corrosion Testing; A Tool of Conservation. E. G. Holmberg. *Chemical Engineering Progress* (Engineering Section), v. 48, Aug. 1952, p. 377-380.

Discusses value of corrosion testing. Describes methods and apparatus used and presents data obtained for several stainless steels, nonferrous alloys, and special high-temperature alloys in solutions of various common organic chemicals at temperatures of 223 and 270°F. Includes photographs and diagrams.

13379 The Protective Properties of the Natural Oxide Film on Aluminium. J. M. Bryan. *Chemistry & Industry*, Aug. 23, 1952, p. 820-822.

Discusses the above in respect to behavior under immersed conditions, reaction with water, factors influencing corrosion, galvanic action, and corrosion by food products. 38 ref.

13380* Corrosion Control in Gas-Lift Wells. D. A. Shock and J. D. Sudbury. *Corrosion* (Technical Section), v. 8, Sept. 1952, p. 296-299.

Describes a study based on South Texan oil fields where severe corrosion was found although producing pressures were not abnormally high.

13381* Potential Measurements in Cathodic Protection Designs. Robert P. Howell. *Corrosion* (Technical Section), v. 8, Sept. 1952, p. 300-304.

Briefly identifies 4 criteria for determining effective cathodic protection: current density, potential change, current-potential curves, and $CuSO_4$ potential. Methods, instruments, techniques, and examples of potential measurements are given. Multiple-rectifier systems, pipe lines in salt water, steel structures in salt water, and oil and gas well casings are considered. 10 ref.

13382* The Role of Oxygen in Corrosion and Cathodic Protection. Roy V. Comeaux. *Corrosion* (Technical Section), v. 8, Sept. 1952, p. 305-309; disc., p. 310.

Discusses practical application of cathodic protection to the underground lines and tank bottoms in Baytown, Texas, refinery of Humble Oil and Refining Co.

13383* Cathodic Protection at Steam-Electric Generating Stations. J. H. Collins and E. H. Thalmann. *Corrosion* (Technical Section), v. 8, Sept. 1952, p. 314-320.

Discusses corrosion of underground structures, applications of cathodic protection, and testing procedures.

13384* A General Theory of Electrochemical Corrosion Prevention. (Russian.) G. A. Akimov. *Doklady Akademii Nauk SSSR*, new ser., v. 84, June 1, 1952, p. 745-748.

Discussion of the above is clarified by diagrams and graphs.

13385* The Inhibition of the Solution of Copper in Nitric Acid. (Russian.) S. A. Balezin and G. S. Parfenov. *Doklady Akademii Nauk SSSR*, new ser., v. 85, July 1, 1952, p. 133-136.

Sodium sulfide, sodium sulfite, sodium thiosulfate, urea, thiourea, potassium permanganate, potassium chlorate, and hydrogen peroxide were tested as inhibitors for the above. Effects of composition and temperature were also determined. Data are tabulated and charted.

13386 Role of Crystal Orientation in the Oxidation of Iron. Earl A. Culbransen and Roswell Ruka. *Journal of the Electrochemical Society*, v. 99, Sept. 1952, p. 360-368.

Describes and illustrates results of experiments made using the electron-diffraction high-temperature camera for the oxidation of single crystal of Fe as related to the processes of oxidation and corrosion. Photographs and tables. 32 ref.

13387* Reduction of Wear and Corrosion by Suitable Design and Choice of Materials. O. Niezoldi. *Engineers' Digest*, v. 13, Aug. 1952, p. 245-246. (Translated and condensed from *Konstruktion*, v. 4, p. 145-148.)

Diagrams illustrate application of the above to miscellaneous pieces of machinery.

13388 Some Factors Affecting the Resistance of Austenitic Chromium-Nickel Steels to Attack by Hot Concentrated Nitric Acid. H. T. Shirley and J. E. Truman. *Journal of the Iron and Steel Institute*, v. 171, Aug. 1952, p. 354-358.

Deals with the behavior of high-alloy Cr-Ni steels in conc. HNO_3. Certain factors which influence the resistance of normally heat-treated unwelded 18/13/1 Cr-Ni-Nb type steel to boiling 70% HNO_3 are discussed. Graphs, tables, photomicrographs.

13389 The Effect of Excreta on Aluminium and its Alloys. R. Butler and E. W. Skerrey. *Light Metals*, v. 15, Aug. 1952, p. 261-266. (Reprinted with revisions from *Water and Sanitary Engineer*, Apr. 1952.)

Effects of human and animal excreta on Al and its alloys is being investigated in a sewage disposal plant, a factory latrine, and a cattle barn. Results obtained after exposures up to 3½ yrs. indicate that Al and its alloys are suitable for use in each of these environments and that NS4 (BA.21) is the most generally suitable alloy. Test panel photographs and tables.

13390* The Electrochemical Influence of Oxide Films and Oxygen Upon the Rate of Corrosion of Metal Surfaces, Especially of Iron. (German.) F. Todt. *Metalloberfläche*, sec. A, v. 6, Aug. 1952, p. A125-A126.

Outlines method for caluculating the above rate. Reviews results of experiments on the above. 11 ref.

13391* Analysis of Metallic Sound as a Test Method. I. Study of Intercrystalline Corrosion in 18-8 Stainless Steels. Characteristic Symmetries in the Elastic Moduli. (Italian.) Oscar Masi and Antonio Ferri. *Metallurgia Italiana*, v. 44, June 1952, p. 207-214.

Gives details of oscillographic procedure in which the sound emitted when test pieces are struck is collected and analyzed. This method appears to have great sensitivity in comparison with others. Typical results are tabulated, charted, and illustrated. Apparatus is described and illustrated.

13392 A Generalized View of the Scaling Behavior of Metals. James T. Waber. *Metal Progress*, v. 62, Sept. 1952, p. 76-80.

Considers above, taking into consideration mathematical growth laws and the Pilling-Bedworth ratio. Graphs and tables give results of scaling experiments with various metals.

13393* These Tools Ferret Out Corrosion. Kenneth W. Robbins and Warner M. Kelly. *Oil and Gas Journal*, v. 51, Aug. 25, 1952, p. 114, 117, 120, 143-145.

Discussion of various means for determining location and severity of corrosion in oil and gas wells, also of different types of corrosion.

13394 Sweet Oil Well Corrosion. H. L. Bilhartz. *Petroleum Engineer*, v. 24, Sept. 1952, p. B78, B82, B87-B88.

See abstract from *World Oil*, v. 134, Apr. 1952, p. 208, 210, 213-214, 216.

13395* Corrosion. 8. Vapour Phase Inhibitors. H. L. Bennister. *Research*, v. 5, Sept. 1952, p. 424-432.

An outstanding feature of above corrosion inhibitors is that they need not be in direct contact with the surface to be protected, but can exert their influence over a distance in space. They may be used in powder form, solution, or coated on paper; for the preservation of the interior of engines and similar machines, and of packaged equipment. Photographs. 17 ref.

13396* Solubility of Metals in Water. (French.) J. C. Pariaud and P. Archinard. *Bulletin de la Société Chimique de France,* May-June, 1952, p. 454-456.

The above was investigated at room temperature, for Zn, Pb, Cu, Ag, and Hg in chemically pure water. Experimental methods, and various processes for the determination of dissolved metals are indicated. Tables. 11 ref.

13397* Research on Anodic Oxidation of Ferrochromium. V. Oxidation in Acid and Neutral Solution. (French.) Jean Besson and Ulrich Bohnstedt. *Bulletin de la Société Chimique de France,* May-June 1952, p. 624-628.

Describes the above in H_2SO_4 solution. Variations with concentration of the acid, voltage, duration of the experiment, temperature, and concentration of Cr^{+6} are described. Data are tabulated and charated.

13398* Influence of Furnace Atmosphere on Surface Finish of Round Ingots and Tubes. (German.) Werner Scheurer. *Stahl und Eisen,* v. 72, July 31, 1952, p. 935-941.

Laws governing the scaling process. Dependence on temperature, thickness of scale layer, time, rate of gas flow, type of gas, and its composition. Operation with oxidizing and reducing flames. Effect of an atmosphere rich in sulfur. Effect of protective gases. Experimental results tabulated, charted, and illustrated. 39 ref.

13399* How To Increase Corrosion Resistance After Welding. *Steel Horizons,* v. 14, Summer 1952, p. 20-23.

Experimental equipment for study of the above is described and illustrated. Macrographs and micrographs show effects of corrosive on welds in types 430 and 442 straight-Cr steels. Effects of heat treatment and of Ti additions were studied.

13400* Materials Testing to Establish the Cause of the Explosion of a Fireless Locomotive by Fracture of the Boiler Flange. (German.) Hans Biegler. *Technik,* v. 7, Mar. 1952, p. 131-134.

Intercrystalline corrosion is shown to have been the cause of the explosion. Photographs, photomicrographs, tables and references.

13401* The Ferroxyl Reagent Applied to a Study of Knitting Needle Corrosion. F. Bryant. *Textile Research Journal,* v. 22, Aug. 1952, p. 553-554.

Tests were carried out on the corrosion problem and the above method proved satisfactory. Needles are of alloy steel.

13402* Water Heater Corrosion Studies. Roy E. Dodson, Jr. *Water and Sewage Works,* v. 99, Sept. 1952, p. 345-349.

Describes methods of carrying out above studies, and includes tabulated results. Tables and photographs.

13403* Rust Prevention. (German.) Otto Gerhardt. *Werkstoffe und Korrosion,* v. 3, Aug. 1952, p. 294-299.

Enlarges on some materials previously published. Reports on use of Al-bronze as an anticorrosive paint in southern climates. Critical discussion by Willi Machu and by Fritz Todt is appended. 32 ref.

Miscellaneous Publications

13404 The Elementary Mechanism of Cathodic Protection. Keith K. Reid, G. C. English, and Ralph L. Horst. American Gas Association, Proceedings, v. 33, 1951, p. 351-360. (TP700 Am35p)

Fundamental mechanism illustrated with cricuit and other diagrams. Tables.

13405 The Performance of Impressed Current Ground Beds. W. Peabody. American Gas Association, Proceedings, v. 33, 1951, p. 448-455. (TP700 Am35p)

Summary of that part of cathodic protection engineering dealing with ground beds used to introduce protection current into the ground from an external source. Development, present practices, effects of soil conditions and anode configuration, selecting sites, and designing installations. Diagrams and charts.

13406 Some Corrosion Problems of Copper Alloys of Special Interest to Workshops. E. Börje Bergsman and Göte Renman. 4th International Mechanical Engineering Congress, June 1952, 6 pages.

Records some examples of corrosion attacks that have occurred in the workshop, classified under the heading of tarnishing and oxidation, galvanic corrosion, stress corrosion, and dezincification.

13407 Intergranular Corrosion in Austenitic Stainless and Acid Resisting Steels and Methods for Determination of Sensitivity to This Corrosion. Bo Hermelin. 4th International Mechanical Engineering Congress, June 1952, 16 pages.

Discusses the interganular-corrosion problem and methods for decreasing susceptibility to this defect. Compares existing test methods for susceptibility to this form of corrosion and otherwise lays the groundwork for a new method suitable for steels intended for welded application. Photomicrographs and diagrams. 25 ref.

13408 Stress-Corrosion in Special Copper-Alloys. O. Lissner. 4th International Mechanical Engineering Congress, June 1952, 18 pages.

Discussion and study of above. 14 different Cu alloys were subjected to a test method for rapidly determining resistance to stress corrosion by using test rods immersed in normal ammonia solution at 80°C. Effects of shape of test piece and stresses are also dealt with. Photomicrographs showing structure and stress-corrosion cracks, tables, and graphs. 18 ref.

See also:

13172 (corrosion resistance of HAE-coated Mg)
13175 (corrosion resistance of Cr-plated toolsteel)
13176 (Zn effects in corrosion resistance of Cr)
13177 (corrosion resistance of chromatic coatings)
13183 (electropolishing vs. corrosion of steel and Al)
13204 (oxidation resistance of Mo borides)
13243 (diffusion in relation to metal oxidation)
13283 (aqueous corrosion of steel drill rods)
13286 (attack of molten Zn alloys on ferrous metals)
13296 (heat treatment for corrosion resistance of stainless)
13320 (corrosion resistance of test steels)
13570 (corrosion resistance of Ni and Ni alloys)
13571 (oxidation characteristics of powder metallurgy parts)
13575 (corrosion resistance of Cr coatings on stainless)
13577 (corrosion resistance of Cr-Fe castings)
13578 (chemical corrosion resistance of straight-Cr stainless)
13579 (corrosion resistance of bearing metals)
13664 (corrosion of engines)
13733 (corrosion resistance of high temperature alloys)
13754 (marine corrosion prevention)

15. ANALYSIS—CHEMICAL AND PHYSICAL

13409* Concerning the Gravimetric-Volumetric Determination of Traces of Calcium in Nearly Eutectic Al-Si Alloys. (Italian.) G. Luft. *Alluminio,* v. 21, June 1952, p. 237-251.

Discusses critically various methods for the above. Gives details of satisfactory procedure developed. Typical data are tabulated and macrographs and micrographs show superficial appearance and microstructure of above alloys containing Ca_2Si inclusions. 42 ref.

13410 The Use of Cylinder Oxygen in the Organic Micro-Determination of Nitrogen. H. Swift and E. S. Morton. *Analyst,* v. 77, Aug. 1952, p. 392-395; disc., p. 395-396.

A practical method is described for the determination of N in substances that burn with difficulty. Diagrams and tables.

13411 Paper Chromatography of Some Starch Conversion Products. J. L. Buchan and R. I. Savage. *Analyst,* v. 77, Aug. 1952, p. 401-406.

Three methods were used for comparing the compositions of white malt syrup and liquid glucose. Discrepancies between results are discussed and reasons are given for preferring those obtained by paper chromatography. Tables.

13412 A Uniform-Temperature Drying Oven for Quantitative Chromatography. N. Albon and D. Gross. *Analyst,* v. 77, Aug. 1952, p. 406-409.

Diagrams and photograph illustrate the above.

15. *Analysis—Chemical and Physical*

13413 Horizontal Paper Chromatography. P. Meredith and H. G. Sammons. *Analyst*, v. 77, Aug. 1952, p. 416-418.

A method of paper chromatography for 1- or 2-dimensional work is described. Apparatus was designed to separate H_2O-soluble constituents of nerve lipid hydrolysates after hydrolysis with methanolic hydrochloric acid. Photographs and diagrams.

13414* Chelate Complex Formation As a Basis for Titration Processes. (English.) G. Schwarzenbach. *Analytica Chimica Acta*, v. 7, Aug. 1952, p. 141-155.

Complex formation reactions lack sharp and definite endpoints and metal cations therefore cannot be titrated with ammonia, cyanide, and other ligands in the same way as H ion can be titrated alkalimetrically. The theoretical reason for this fact is discussed and it is shown that complex formations gain the characteristic properties of neutralization reactions if the simple ligands are replaced by a polydentate group which is able to satisfy not only one, but several of the coordination points of the metal cation. A great number of titration processes can be based on such reactions. 24 ref.

13415* A General Theory of Quantitative Endpoint Sharpness. (French.) F. L. Hahn. *Analytica Chimica Acta*, v. 7, Aug. 1952, p. 156-171.

Buffer capacity of the final solution (exactly titrated to equivalence) of a titration can be calculated from the equilibrium constant of the titrating reaction. This makes it possible to establish a theory of "end-point sharpness" applicable universally to different classes of titrations.

13416* Use of Polarization Curves in Electro-Chemical Determinations. I. General Properties. (French.) R. Gauguin, G. Charlot, and J. Coursier. *Analytica Chimica Acta*, v. 7, Aug. 1952, p. 172-184.

A systematic study, based on use of polarization curves, permits a simple forecast of conditions for each method in order to give accurate results.

13417* Microiodometry in Spectrophotometry. Application to Microdetermination of Phosphites. (French.) C. Vermeil. *Analytica Chimica Acta*, v. 7, Aug. 1952, p. 191-195.

13418 High-Frequency Titration; Theoretical and Practical Aspects. James L. Hall. *Analytical Chemistry*, v. 24, Aug. 1952, p. 1236-1240.

An explanation of the relations among the properties of the solutions being studied, electrical characteristics of the cells or titration vessels used, and response yielded by various instruments, with regard to the above. Also defines equivalent circuits of the cells and instruments in order to calculate the absolute values of conductances for solutions in high-frequency titration cells. Diagrams, titaration curves, and equations. 25 ref.

13419 Theory of Chemical Analysis by High-Frequency Methods. W. J. Blaedel, H. V. Mamstadt, D. L. Petitjean, and W. K. Anderson. *Analytical Chemistry*, v. 24, Aug. 1952, p. 1240-1244.

Explains semiquantitatively the nature of the response of high-frequency instruments for chemical analysis. Two types of curves of response vs. concentration for electrolyte solutions obtained by different instruments are shown. Basic assumptions explaining the dependency of these curves upon the properties of the solution and the oscillator are drawn and experimental support of the theory is given. Graphs. 12 ref.

13420 Practical High-Frequency Titration Apparatus for General Laboratory Use. James L. Hall. *Analytical Chemistry*, v. 24, Aug. 1952, p. 1244-1247.

Describes above instrument which will respond to both effective over-all capacitance and effective over-all conductance changes of a titration cell. Basis for this instrument is a simple crystal oscillator circuit and a commercially-obtained vacuum-tube voltmeter. Circuit diagram and acid-base titration curves.

13421 Titration of Sulfates With Aid of a High-Frequency Oscillator. Oscar I. Milner. *Analytical Chemistry*, v. 24, Aug. 1952, p. 1247-1249.

Describes a method which uses a titrator of the tuned-plate tuned-grid type, suitable for determination of sulfate in aqueous solutions containing a few tenths of a mg. of sulfate. Includes photograph of the set-up, tables, graphs, and circuit diagram. 21 ref.

13422 Infrared Spectra and Characteristic Frequencies of Inorganic Ions; Their Use in Qualitative Analysis. Foil A. Miller and Charles H. Wilkins. *Analytical Chemistry*, v. 24, Aug. 1952, p. 1253-1294.

Infrared spectra of 159 pure inorganic compounds (principally salts of polyatomic ions) are presented in both graphical and tabular form. A table of characteristic frequencies are shown to be useful in qualitative analysis of inorganic unknowns. Still more fruitful is a combination of emission analysis, infrared examination, and x-ray diffraction, in that order. Several exdiagram. 12 ref.

13423 Spectrophotometric Determination of One Component in a Two-Component Mixture; Simple Method for Improving Precision. Eugene Allen and Ellwood M. Hammaker. *Analytical Chemistry*, v. 24, Aug. 1952, p. 1295-1298.

Describes a method whereby precision of determining one component in a two-component mixture can be improved considerably. A solution of the component that is not being determined is used as a reference in place of plain solvent. Graphs, tables, and equations.

13424 Chemical Analysis and Isotopic Assay of Organic Compounds. R. Christian Anderson, Yvette Delabarre, and Aksel A. Bothner-By. *Analytical Chemistry*, v. 24, Aug. 1952, p. 1298-1303.

Describes a method which gives by use of a single microsample, C and H percentages plus derivatives that can be used for C^{13} or C^{14} and deuterium assay. Illustrations, tables, and diagrams. 12 ref.

13425 Investigation and Application of the Zinc-1,10-Phenanthroline Complexes. J. M. Kruse and Warren W. Brandt. *Analytical Chemistry*, v. 24, Aug. 1952, p. 1306-1308.

Reaction of Zn and 1,10-phenanthroline was investigated in order to determine possible analytical applications in spectrophotometry and as an anion precipitant. Results of a detailed spectrophotometric study are shown. Sensitivity of the system as a precipitant for vanadate, molybdate, and ferricyanide was demonstrated.

13426 Streak Reagents for Chromatography. Arthur L. LeRosen, Richard T. Moravek, and Jack Carlton. *Analytical Chemistry*, v. 24, Aug. 1952, p. 1335-1336.

Presentation of 13 reagents for use in detection of colorless zones on a silicic acid column. Preparation and stability are discussed; compounds detected, reagent used for detection, and color of reaction product are tabulated. 11 ref.

13427 Microdetermination of Chromium in Blood. H. J. Cahnmann and Ruth Bisen. *Analytical Chemistry*, v. 24, Aug. 1952, p. 1341-1345.

Describes a spectrophotometric micromethod based on the reaction of hexavalent Cr with s-diphenylcarbazide, which results in the formation of a pink color. Graphs. 40 ref.

13428 Chloric Acid Method for Determination of Protein-Bound Iodine. Bennie Zak, H. H. Willard, Gordon B. Myers, and A. J. Boyle. *Analytical Chemistry*, v. 24, Aug. 1952, p. 1345-1349.

Describes a method for the above which permits simultaneous estimation of protein-bound iodine in multiple samples and obviates the necessity of separating the iodine present in the sample from the digestion mixture by steam distillation. Accuracy is in the neighborhood of ±15%. 21 ref.

13429 Suggested Nomenclature in Applied Spectroscopy. H. K. Hughes. *Analytical Chemistry*, v. 24, Aug. 1952, p. 1349-1354.

Report of Joint Committee on Nomenclature in Applied Spectroscopy established by Society for Applied Spectroscopy and ASTM. 30 ref.

13430 Determination of Organic Peroxides. E. W. Abrahamson and Henry Linschitz. *Analytical Chemistry*, v. 24, Aug. 1952, p. 1355-1356.

Dead-stop end point as applied to iodometric determination of small amounts of organic peroxides. Tables.

13431 Conversion of Hydrogenic Materials to Hydrogen for Isotopic Analysis. Jacob Bigeleisen, M. L. Perlman, and H. C. Prosser. *Analytical Chemistry*, v. 24, Aug. 1952, p. 1356-1357.

The isotopic analysis of H_2 by mass spectrometry is complicated by the fact that water, obtained by combustion of hydrogenic materials, is strongly absorbed onto the walls of combustion trains and vacuum systems. Thus, large "memory" effects are observed when water is introduced into conventional mass spectrometers. Minimization may be obtained for a variety of hydrogenous compounds by their reactions with hot uranium to produce pure H_2 which may be analyzed mass spectrometrically. Schematic diagram of apparatus. 11 ref.

13432 Isotopic Method for Direct Determination of Oxygen in Fluorocarbon Derivatives. A. D. Kirshenbaum, A. G. Streng, and A. V. Grosse. *Analytical Chemistry*, v. 24, Aug. 1952, p. 1361-1362.

Describes principles and procedure in the elementary isotopic method. 15 ref.

13433 Colorimetric Determination of Amides as Hydroxamic Acids. Felix Bergmann. *Analytical Chemistry*, v. 24, Aug. 1952, p. 1367-1369.

The methods described are of special interest in view of recent reports on the enzymatic conversion of amides and peptides into hydroxamic acids. Graphs, tables, formulas.

13434 Amperometric Determination of Fluoride. C. R. Castor and J. H. Saylor. *Analytical Chemistry*, v. 24, Aug. 1952, p. 1369-1371.

The method described depends upon decrease in diffusion current of an aluminium-dye complex in the presence of fluoride ion with a corresponding increase in the diffusion current of the free dye. Tables and graphs.

13435 Benzidine Reagent in Paper Chromatography. Howard Miller and D. M. Kraemer. *Analytical Chemistry*, v. 24, Aug. 1952, p. 1371-1372.

Results of study of reactions of above reagent in paper chromatography of various inorganic and organic substances. Tables.

13436 Polarographic Determination of Iron in Nonferrous Alloys. Louis Meites. *Analytical Chemistry*, v. 24, Aug. 1952, p. 1374-1376.

Describes method for above which consists of reduction of Cu to the metal with amalgamated Zn. Tables. 14 ref.

13437* Chromatography With Carboxyl Paper. (German.) Theodor Wieland and A. Berg. *Angewandte Chemie*, v. 64, Aug. 7, 1952, p. 418-419.

Chromatographic investigations with filter papers of a carboxyl content of 1-4% showed promising results with amino acids as well as amines and inorganic ions.

13438* Influence of Structure on the Appearance of the Sparks Appearing During Polishing of Unalloyed and Alloyed Steels. (German.) Johanna Hunger and Otto Werner. *Archif für das Eisenhüttenwesen*, v. 23, July-Aug. 1952, p. 277-286.

Discusses dependence of appearance and size of the sparks upon carbon content. The possibility of characterizing the structure of chemically identical unalloyed steels and cast iron from the appearance of the sparks is indicated. Data are tabulated; micrographs and diagrams illustrate the article. 27 ref.

13439* Determination of Iron in Cement and Ceramic Substances. (German.) Fritz Rincke and Dieter Ostwald. *Berichte der Deutschen Keramischen Gesellschaft e. V. und des Vereins Deutscher Emailfachleute e. V.*, v. 29, Apr. 1952, p. 124-128.

Compares the permanganate, bichromate, titanium trichloride, stannous chloride, and potassium iodide-thiosulfate processes for accuracy, economy in time, and cost in determination of the above. Graphs and tables.

13440* Determining the Oxygen Content of Coals. (German.) Heimo Schöberl. *Brennstoff-Chemie*, v. 33, July 23, 1952, p. 241-244.

An example reveals the errors in the direct determination of above. A modified differential method of replacing the ash content by true minerals content and of considering the carbonate carbon in the coal is proposed. Tables and references.

13441* The Determination of Some Residual Elements Which Produce Harmful Effects in Magnesium-Treated Nodular Cast Iron. W. Westwood and R. Presser. *British Cast Iron Research Association Journal of Research and Development*, v. 4, Aug. 1952, p. 369-386.

Presents individual chemical methods of determining presence of Al, Sb, As, Bi, Pb, Sn, and Ti in pig iron.

13442* The Application of the Combustion Sulphur Method to Cast Iron. *British Cast Iron Research Association Journal of Research and Development*, v. 4, Aug. 1952, p. 387-390.

Describes use of above method for routine determinations. Tables.

13443* Microbiological Methods in the Control of Pharmaceuticals. John S. Cannell. *Export Review of the British Drug & Chemical Industries*, v. 13, Aug. 1952, p. 71-73.

Discusses above with particular emphasis on assay of penicillin.

13444 Paper Chromatographic Separation of Some Biologically Important Phosphate Esters. D. C. Mortimer. *Canadian Journal of Chemistry*, v. 30, Sept. 1952, p. 653-660.

Goal of the experiments reported was to develop 3 chromatographic solvent mixtures which would produce unique position patterns for group of phosphate esters, and to apply these in combinations to 2-dimensional chromatograms.

13445 The Polarographic Determination of Titanium in Steels and Nickel-Base Alloys. R. P. Graham, A. Hitchen, and J. A. Maxwell. *Canadian Journal of Chemistry*, v. 30, Sept. 1952, p. 661-667.

Investigation of the above includes removal of interferences, apparatus and reagents, methods of analysis, and applications. 25 ref.

13446 A Rapid Method for the Determination of Sodium in Serum. H. J. Suderman and G. E. Delory. *Canadian Journal of Medical Sciences*, v. 30, Aug. 1952, p. 302-307.

A colorimetric method for the determination of serum Na is described in which it is precipitated from deproteinized serum by uranyl zinc acetate. After washing, the precipitate is taken up in water and the amount of color developed on addition of sodium salicylate is measured.

13447* Cathode-Ray Oscilloscopic Investigation of Phenomena at Polarizable Mercury Electrodes. J. West Loveland and Philip J. Elving. *Chemical Reviews*, v. 51, Aug. 1952, p. 67-117.

Discussion of the theory, experimental principles, applications, and results of the application of the above including oscillographic polarography. Tables and diagrams. 80 ref.

13448* Experiments on End-Point Determination in Precipitation Reactions With the Drage Viscosimeter. (German.) A. G. Epprecht. *Chemie-Ingenieur-Technik*, v. 24, Aug. 1952, p. 455-456.

The idea that quick-reading viscosimeter might indicate the change of the frictional conditions in a liquid during precipitation reactions led to experiments on the above. Results are presented.

13449* Problems of the Distillation Method of Analyzing Mixtures of Synthetic Fatty Acids. (German.) E. Krell. *Chemische Technik*, v. 4, May 1952, p. 200-207.

Describes study and experiments made to develop an industrially feasible rapid analytical method, including a critical examination of the Engler and the Claisen-flask methods. Tables, graphs, and diagrams. 25 ref.

13450* Rapid Methods of Microelementary Analysis. Simultaneous Determination of Carbon, Hydrogen, and Silicon. (Russian.) V. A. Klimova, M. O. Korshun, and E. G. Bereznitskaia. *Doklady Akademii Nauk SSSR*, new ser., v. 84, June 21, 1952, p. 1175-1178.

Results for a series of organic compounds are tabulated.

15. *Analysis—Chemical and Physical*

13451 Determination of Iron in Ores, Slags, and Refractories. *Journal of the Iron and Steel Institute*, v. 171, Aug. 1952, p. 392-403.

H_2S reduction procedure for Fe determination is recommended from more general application. Confirmation is provided from extended trials on synthetic solutions and oxide-type materials. Tables.

13452 Free Molecular Flow in the Sample Inlet to the Mass Spectrometer. Paul D. Zemany. *Journal of Applied Physics*, v. 23, Aug. 1952, p. 924-927.

Points out aspects of free molecular flow in the sample inlet to the mass spectrometer. Conditions under which such flow can occur are described. Methods for calculating leak diameter and sample pressure for various flow rates are developed.

13453* Volumetric Determination of Calcium in Blood Serum. William E. Elliott. *Journal of Biological Chemistry*, v. 197, Aug. 1952, p. 641-644.

Determination by rapid titration with disodium dihydrogen ethylenediamine tetraacetate as described shows an average error of less than 2%. The average titration consumed less than 5 min.

13454* Detection and Colorimetric Estimation of Vanadium With Benzohydroxamic Acid. A. K. Das Gupta and M. M. Singh. *Journal of Scientific & Industrial Research*, v. 11B, July 1952, p. 268-273.

Presents conditions for detection and estimation of microgram amounts of V in the presence of an excess of foreign ions by characteristic colors of the complexes formed by V with the K salt of benzohydroxamic acid.

13455* Paper Chromatographic Analysis of Organic Acids (Horizontal Migration Method). Part I. V. K. Mohan Rao. *Journal of Scientific & Industrial Research*, v. 11B, July 1952, p. 277-279.

Shows use of Rutter's modification of paper chromatography as applied to separation of tartaric, citric, oxalic, succinic, fumaric, lactic, malic, and gluconic acids. Tables. 11 ref.

13456* A Modification in the Paper Chromatographic Separation of Sugars and Amino Acids. R. Radhakrishnamurty and P. S. Sarma. *Journal of Scientific & Industrial Research*, v. 11B, July 1952, p. 279-286.

Describes improved technique of ascending chromatography consisting of use of filter-paper discs for increasing solvent absorbing capacity and, therefore, developing time. Use in indentification of amino acids in acid hydrolysates of casein and gelatin, and of sugars in acid hydrolysate of green gram, (*Phaseolus aureus*) is shown. 11 ref.

13457* Infrared-Spectrometric Method for Chromatographic Separation of Colorless Substances. (German.) Herbert Hoyer. *Kolloid Zeitschrift*, v. 127, July 1952, p. 166-168.

Brief description of equipment and procedure includes charts and illustrations.

13458* Notes on the Quantitative Spectrographic Determination of Manganese and Silicon in Special Steels. (Italian.) Mario Ongaro. *Metallurgia Italiana*, v. 44, June 1952, p. 221-225.

Results of experiments on effect of principal alloying elements on spark intensity, variation in excitation of the Mn and Si lines along the discharge section obtained with 4 different sources, and effect of metallurgical history of the specimen. Describes recommended sources for determination of Mn and Si in high-speed and stainless steels.

13459 Paper Chromatography of Phenolic Substances. G. M. Barton, R. S. Evans, and J. A. F. Gariner. *Nature*, v. 170, Aug. 9, 1952, p. 249-250.

Gives details of procedure worked out for separation of various phenols found in heartwood extracts of conifers.

13460 Use of n-Butanol-Formic Acid-Water Mixture in the Paper Chromatography of Amino-Acids and Sugars. L. F. Wiggins and J. Howarth Williams. *Nature*, v. 170, Aug. 16, 1952, p. 279-280.

Photographs.

13461 Radioactive Isotope Dilution Method for Determining Sulfate Concentration in Chromium Plating Baths. Stanley L. Eisler. *Plating*, v. 39, Sept. 1952, p. 1019-1023, 1031.

See abstract "Determination of Sulphate in Chromium Baths using Radio Barium". *Metal Finishing*, v. 50, Jan. 1952, p. 71-74.

13262 Rapid Method for Determination of Oxygen in Carbon. (French.) Blanzat and Barbe. *Bulletin de la Société Chimique de France*, May-June 1952, p. 569-573.

Describes combustion-train method and presents typical tabular data. Apparatus is diagrammed.

13463* Observations of the Birefringence and Refractive Index of Synthetic Fibers With Special Reference to Their Identification. A. N. J. Heyn. *Textile Research Journal*, v. 22, Aug. 1952, p. 513-522.

Discusses the above, explaining methods and giving tabulated results. 26 ref.

13464* Flame Photometric Determination of Rubidium. H. E. Freytag. (German.) *Fresenius' Zeitschrift für analytische Chemie*, v. 136, no. 3, 1952, p. 161-177.

Theoretical discussion of above is followed by description of procedure with the Zeiss flame photometer. Results with margins or error ranging from +2.8 to −0.5% are charted and tabulated.

13465* A Simple Device for Conductometric Titrations. (German.) R. Weiner and L. Koller. *Fresenius' Zeitschrift für analytische Chemie*, v. 136, no. 4, 1952, p. 241-246.

Describes and presents circuit diagrams for the above.

13466* Rapid Analytical Determination of Potassium by Conductometric Titration. (German.) R. Weiner and L. Koller. *Fresenius' Zeitschrift für analytische Chemie*, v. 136, no. 4, 1952, p. 246-254.

Description of procedure includes graphed and tabulated results. 12 ref.

13467* Colorimetric Determination of Magnesium With Titanium Yellow. (German.) Oskar Glemser and Walter Dautzenberg. *Fresenius' Zeitschrift für analytische Chemie*, v. 136, no. 4, 1952, p. 254-261.

Describes procedure for above and discusses effects of various factors. Tables and graphs. 12 ref.

13468* Internal-Electrolysis Titrations. (German.) Alwin Schleicher. *Fresenius' Zeitschrift für analytische Chemie*, v. 136, no. 5, 1952, p. 330-336.

Describes experiments and shows that the "internal-electrolytic" reduction of permanganic acid, but not chromic or vanadic acid, can be visually observed. 12 ref.

13469* Alkalimetric Determination of Cadmium. (German.) Georg Denk. *Fresenius' Zeitschrift für analytische Chemie*, v. 136, no. 5, 1952, p. 336-344.

Describes titration procedure for the above, using different Cd compounds. Tables.

13470* Analytical Use of Trithiocarbonic Acid. 4. Determination of Antimony. (German.) E. Gagliardi and W. Pilz. *Fresenius' Zeitschrift für analytische Chemie*, v. 136, no. 5, 1952, p. 344-348.

Above is shown to be a less time-consuming method of analyzing Sb-containing substances. Tables.

13471* Quantitative Analysis With Improved Reductor Burettes. Report I. Determination of Iron. Report II. Determination of Titanium. (German.) Peter Wehber and Harry Hahn. *Fresenius' Zeitschrift für analytische Chemie*, v. 136, no. 5, 1952, p. 321-330.

Describes separately procedures for determining Fe and Ti in compounds. Diagrams and tables. 14 ref.

13472* A New Atomizer for Flame Photometry. (German.) Roland Herrmann and Heinz Schellhorn. *Zeitschrift für angewandte Physik*, v. 4, June 1952, p. 208-210.

Above is claimed to be 10 times more efficient than other commercially available atomizers. Table, graph, and diagram.

13473* Significance of Zn as an Alloy in Spectrographic Investigations of the Al-Mg System. (German.) Jan Van Calker and Rudolf Wienecke. *Zeitschrift für angewandte Physik*, v. 4, June 1952, p. 210-215.

Results of experiments show that effect of Zn on spectrographic analysis varies with Zn content and various analytical conditions. Graphs. 15 ref.

13474* Flame-Photometric Determination of Calcium. (German.) J. Köhnlein and K. E. Lücke. *Zeitschrift für Pflanzenernahrung; Düngung; Bodenkunde*, v. 57(102), no. 2, 1952, p. 114-121.

Shows that phosphate ions in solution causes results of the Ca determination to be low. Suitable and unsuitable filters are discussed. Tables, graphs, and references.

Miscellaneous Publications

13475 Apparatus and Methods for Volumetric Gas Analysis at the Institute of Gas Technology. H. Hakewill and M. C. Miyaji. American Gas Association, Proceedings, v. 33, 1951, p. 470-475. (TP700 Am35p)

Critical discussion of performance. Tables and photograph.

13476 Determination of Oxygen in Metals and Metal Oxides by the Isotopic Method. A. D. Kirshenbaum and A. V. Grosse. American Society for Metals, Preprint 39, 1952, 11 pages. (TS300 Am35p)

Quantitative methods for determining O_2 content of metals used at present are long, tedious, and at times not too accurate. The method described uses O^{18} and does not require quantitative separation or recovery of the O_2, thus giving fast results accurately. Accurate O_2 values were obtained with this method for several Cu-O_2 and Fe-O_2 alloys and for Cu and iron oxides. 27 ref.

13477 Sorting of Foundry Pig Irons According to Silicon Content With Use of a Thermoelectric Apparatus. A. V. Golovin. Henry Brutcher, Translation 2674, 5 pages. (From *Zavodskaya Laboratoriia*, v. 13, July 1947, p. 886-887.)

Previously abstracted from original.

Books

13478 Paper Chromatography: A Laboratory Manual. Richard J. Block, Raymond LeStrange, and Gunter Zweig. 195 pages. 1952. Academic Press Inc., New York. (TS1109 B62p)

Practical manual in which tried and proven procedures, employing relatively simple equipment and available reagents are summarized. Correlates work during the past 8 yrs. Theory, indexes, and 9 page bibliography.

See also:
13396 (determination of metallic ions in solution)
13694 (chemical analysis in whiteware industry)
13867 (indentification of primary alkyl amines)
13903 (analytical methods for glycols)
14224 (analyzing Sn for impurities)

16. APPARATUS, METHODS, AND STANDARDS

13479* Applied Spectrophotometry. I. Color Matching With the Aid of the "R" Cam. Roland E. Derby, Jr. *American Dyestuff Reporter*, v. 41, Sept. 1, 1952, p. P550-P557.

Considers general theory of the above with emphasis on dyeing of wool. Equations, tables, and graphs. 27 ref.

13480 Sonic Tester Checks Bonding of Honeycomb Panels. H. O. Williams. *American Machinist*, v. 96, Sept. 1, 1952, p. 116-117.

Brief report of how dancing grains of sand outline unbonded areas of honeycomb panels in new sonic testing device. Inspection is positive and twice as fast.

13481 An Investigation of Anionic Interference in the Determination of Small Quantities of Potassium and Sodium With a New Flame Photometer. G. C. Collins and H. Polkinhorne. *Analyst*, v. 77, Aug. 1952, p. 430-436.

Describes design, construction and performance of a new commercial photometer, with particular reference to the above. Tables, graphs, photographs, and diagrams.

13482* Requirements for Radiographs for Quantitative Investigations. Contribution to the Knowledge of the Numercial Intensity Film Curve in Exposures With X-Rays and of Conditions for the Development of X-Ray Films. (French.) E. Treiber and J. Schurz. *Angewandte Chemie*, v. 64, Aug. 21, 1952, p. 453-457.

Requirements include minimum basic fog and fine grain. Strict proportionality between x-ray intensity and film density are also often required. Shows how far fine-grain developing rich in contrast and reduction of the fog can be achieved by varying composition of the developer. 26 ref .

13483* An Automatic Colorimeter. H. Dijkstra and B. S. Sieswerda. *Applied Scientific Research*, v. 2, sec. B, p. 429-452.

A description is given of an automatic photo-electric colorimeter which may be used for continuously recording absorption of liquid flowing through the measuring cuvette, and offers the possibility of operating a regulating device for controlling a continuous chemical process. The reproducibility of the results is given. Apparatus described. Diagrams.

13484 Mathematical Analysis of Size-Frequency Distributions of Particles in the Subsieve Range. E. E. Petersen, P. L. Walker, and C. C. Wright. *ASTM Bulletin*, July 1952, p. 70-75.

A method is proposed for calculation of surface area and weight distributions from microscopic size-frequency measurements wherein the necessity of assuming a mean diameter to represent the size interval is obviated. This method permits microscopic classification of particles into broader intervals than currently recommended, thereby reducing time consumed in counting particles, especially when the sample contains a wide range of sizes. Statistical analysis of count data for coal samples with sizes ranging from 1 to to 100μ indicates that reproducibility is sufficient to warrant calculations on the basis of the method described.

13485* Limitations of Magnetic Tape. W. S. Latham. *Audio Engineering*, v. 36, Sept. 1952, p. 19-20, 68-69.

Shows that certain applicatons of above in the fields of research and development as well as in industry, are at present restricted by limitations of the medium itself. Photomicrographs and graphs.

13486* Noise Measuring Instruments. W. Bye. *Automobile Engineer*, v. 42, Aug. 1952, p. 317-320.

Analysis of noise, and some installation methods for the above. Photographs.

13487 A Fast Accurate Method for Detecting Leaks. Lorance E. Sterns. *Automotive Industries*, v. 107, Sept. 1, 1952, p. 52-56, 86.

Describes vacuum testing as used in automotive plants to test for leaks in engine parts, transmission cases, rear-axle housings, oil seals, oil pans, windshield wipers, and water pumps. Greater range is expected. Diagrams.

13488* The Fusion Behavior of Seger Cone Masses in the High-Temperature Microscope. (German.) W. Mann. *Berichte der Deutschen Keramischen Gesellschaft e.v. und des Vereins Deutscher Emailfachleute e.V.*, v. 29, May 1952, p. 163-168.

Describes most recent development of the Leitz-type high temperature microscope, and its use for photographing the softening and melting of inorganic substances at temperatures up to 1600°C. Application of this microscope to investigations of Seger cones is indicated. Series of shadowgrams, charts, and tables.

13489* The Spectrophotometry of Light Sources. S. T. Henderson. *British Journal of Applied Physics*, v. 3, Aug. 1952, p. 255-259.

Calibration and use of simple, non-automatic equipment for above is described, with particular attention to precautions required for accuracy. Computation of chromaticity is illustrated for a variety of lamps. Change of chromaticity of fluorescent lamps with varied loading is analyzed and application to phosphors mentioned. 13 ref.

16. *Apparatus, Methods, and Standards*

13490 Size Reduction. Jullian C. Smith. *Chemical Engineering*, v. 59, Aug. 1952, p. 151-166.

Selection of crushing, grinding, and pulverizing equipment including jaw crushers, gyratory crushers, roll crushers, revolving mills, hammer mills, hogs, attrition mills, fluid-energy mills, and mills with multiple functions. Diagrams and graphs.

13491 Radiation Shielding. Richard Stephenson. *Chemical Engineering Progress* (Engineering Section), v. 48, Aug. 1952, p. 401-402.

Discusses the above for the main nuclear radiations which are of concern to the engineer.

13492* Wire-Form Anticathodes: Application to X-Ray Diffraction by Crystals. (French.) Jean Barraud and Claire Pierrée. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences*, v. 235, July 7, 1952, p. 72-74.

Above type of anticathodes were used for obtaining Laue diagrams of various crystal structures. Advantages of the method are outlined.

13493* Production of Symmetrical Debye-Scherrer Transmission Semi-Diagrams, Using Filtered Radiation. (French.) Adolphe Jean Rose. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences*, v. 235, July 7, 1952, p. 74-76.

Describes experimental apparatus for the above. Experiments show that excellent diagrams can be obtained with very fine rays, if parallel and filtered x-ray beams are used.

13494* Method of Mutual Polishing of Crystals for Determining Relative Values of Surface Energy. (Russian.) V. D. Kuznetsov. *Doklady Akademii Nauk SSSR*, new ser., v. 84, June 11, 1952, p. 927-930.

Discusses the above process and cites typical data for some inorganic salt crystals.

13495* Refractometric Method for Investigating Melts. (Russian.) B. V. Stark and Iu. M. Shashkov. *Doklady Akademii Nauk SSSR*, new ser., v. 85, July 1, 1952, p. 125-128.

Discusses use of the refractometer for slag studies. Typical data are tabulated.

13496* Applications of Finger-Type Regulators. N. H. Magida. *Electrical Manufacturing*, v. 50, Sept. 1952, p. 117-118, 320, 322.

Describes the above as being used in a variety of basic servo systems involving regulation through feedback. Diagrams.

13497* Natural and Artificial Sources for Gamma Radiography. B. N. Clack. *Engineer*, v. 194, Aug. 8, 1952, p. 195-198.

Discusses requirements for the above, as applied to 4 groups of uses. Second part describes preparation of a radiographic source using radon and some of the problems encountered. Diagrams, graphs, and illustrations.

13498 Measuring Low-Level Radioactivity. David L. Douglas. *General Electric Review*, v. 55, Sept. 1952, p. 16-20.

Discusses origin of radiocarbon dating as well as the instruments and techniques for measuring above.

13499 Electro-Optical Shutters for Ballistic Photography. B. James Ley and Philip Greenstein. *Electronics*, v. 25, Sept. 1952, p. 123-125.

Equipment developed for Kerr electro-optical shutters gives either single pulse or 10 identical pulses spaced 25, 50, or 100 microsec. apart. A modified line modulator employing capacitor discharge through a type 4C35 hydrogen thyratron and very low-impedance load produces a 50,000 volt pip. Circuit diagrams.

13500 Ultraviolet Television Microscopy. V. K. Zworykin, L. E. Flory, and R. E. Shrader. *Electronics*, v. 25, Sept. 1952, p. 150-152.

Thin sections of biological tissue were observed by above methods. Photographs, diagram, and graphs.

13501 Multiple-Unit Control System. F. P. McKnight. *Electronics*, v. 25, Sept. 1952, p. 200, 204, 208, 213.

Describes and diagrams device for operating controls at a number of similar points in response to some measured condition. In this particular application, the instrument was a pyrometer measuring the temperature of a number of thermocouples, but it could just as well be controlled by other properties measured with a multipoint recorder such as voltage, current, pressure, and flow.

13502* The Counting Strain Gauge. J. B. Lambie. *Engineering*, v. 174, Aug. 8, 1952, p. 168-170.

Describes and diagrams above apparatus designed to integrate information on magnitude and frequency of loads occurring during normal operational life of aircraft, also to interpret a random series of loads, as measured in flight, in terms of laboratory tests on materials and structures. Typical recordings are illustrated and discussed.

13503* Interpretation of Physical Measurements of the Conductivity of Fibrous Materials. (French.) A. Liebaut. *Flamme et Thermique*, v. 6, July 1952, p. 11-27.

Proposes a theoretical equation for determining thermal conductivity. Determination of its constants from experimental results is described.

13504* Measurement of Temperatures in the Casting of Copper Alloys. (French.) Albert Blondel. *Fonderie*, July 1952, p. 3007-3022.

Discusses the above on the basis of the literature. Treats in particular various types of thermocouples, their insulation, electrical measuring instruments, and optical and radiation pyrometers. Experiments for the comparative study of the various devices are outlined. Graphs, diagrams, and photographs. 18 ref.

13505 A Universal Unit for the Electrical Differential Analyzer. Rajko Tomovich. *Journal of the Franklin Institute*, v. 254, Aug. 1952, p. 143-151.

Describes an electromechanical unit which performs various mathematical operations occurring in solution of differential equations by analog methods. The operations in question are essentially those that cannot be solved by use of conventional d.c. amplifier technique. Combination of the proposed units and d.c. amplifiers only, meets all requirements for a complete, general-purpose differential analyzer.

13506 Do Radioactive Wastes Contaminate Drain Piping? Albert P. Talboys. *Heating, Piping and Air Conditioning*, v. 24, Sept. 1952, p. 80-83, 87.

Shows that drain lines can be contaminated by radioactive wastes such as I^{131}, Sr^{89}, and P^{32}, according to tests made at Johns Hopkins University. Investigations also indicate precautions to be observed. Tabular data.

13507* Studies on the Surface Roughness of Metals Finished by Cutting. (Japanese.) Norio Takenaka. *Report of the Institute of Industrial Science, University of Tokyo*, v. 1, no. 6, 1951, p. 170-206.

Previously abstracted from *Japan Science Review*, v. 2, Aug. 1951, p. 147-158.

13508 Valve Rangeability. Ralph A. Rockwell. *Instruments*, v. 25, Aug. 1952, p. 1074-1079, 1126, 1128-1130.

Presents, first, theoretical aspects of rangeability; and second, practical considerations affecting the flow range of control valves. Graphs.

13509 Principles of Fluid Flow. D. P. Eckman. *Instruments*, v. 25, Aug. 1952, p. 1082, 1144, 1146, 1148.

Comparison of experimental data and theoretical principles shows the necessity for experimental determination of flow coefficients. Also includes a technique, based on Venturi flow-coefficients, for sizing control valves.

13510 Carbon and Alloy Tool Steels: Problems of Standardization. H. Carr. *Iron & Steel*, v. 25, Sept. 1952, p. 401-405.

Discussion of above, concluding that some form of standardization is really necessary but must be supplemented by other more complex physical specifications. Also details the Jominy hardenability test. Tables and graphs. 11 ref.

13511 X-Ray Diffraction by Face-Centered Cubic Crystals With Deformation Faults. M. S. Peterson. *Journal of Applied Physics*, v. 23, Aug. 1952, p. 805-811.

Describes results of a calculation for face-centered cubic crystals in which the faults occur in (111) planes; detailed intensity distribution in the reciprocal lattice, the positions of the intensity maxima and their breadths, and other results expressed in terms of the density of faulting. 13 ref.

13512 A Point Focusing X-Ray Monochromator for the Study of Low Angle Diffraction. Leon Shenfil, Warren E. Danielson, and Jesse W. M. DuMond. *Journal of Applied Physics*, v. 23, Aug. 1952, p. 854-859.

Illustrations and photographs of a point focusing x-ray monochromator designed and constructed for low-angle scattering studies. Anastigmatic point focus is achieved by means of 2 cylindrically bent quartz crystals whose focal circles are mutually perpendicular. Mathematical analysis, in which a ray was traced through the 2 crystal system, revealed correctly the shape and size of the point focus, and the possibility of reducing the latter in size by stopping down the beam emerging from the target.

13513 Production of Monochromatic X-Radiation for Microradiography by Excitation of Fluorescent Characteristic Radiation. T. H. Rogers. *Journal of Applied Physics*, v. 23, Aug. 1952, p. 881-887.

Describes one phase of a program involving development of more advanced techniques for historadiography and histochemical analysis, beginning with the work of Marinelli, Ferlazzo, Fitzgerald, and Foote at the Sloan-Kettering Institute. Work involved analysis of human thyroid tissue for iodine content, by means of historadiography done with a conventional tungsten target tube equipped with a special Be window 0.2-mm thick. 11 ref.

13514 A High Speed Transient Recorder. D. R. Hardy. *Journal of Scientific Instruments*, v. 29, Aug. 1952, p. 241-242.

Describes how design of a high-speed oscillograph may be modified to produce a near-linear recordable sweep of 10^{-5} sec. duration. Techniques necessary to reproduce photographically single transients of this order are discussed.

13515 A Simple Automatic Gas Flow-Limiting Valve. F. Call. *Journal of Scientific Instruments*, v. 29, Aug. 1952, p. 246-247.

Details are given of a simple robust valve which limits flow rate of gases to a maximum value irrespective of suction applied. The device is capable of maintaining flow rate constant over a wide range of driving pressures, and adjustments are provided for varying this rate between wide limits.

13516 A Device for Marking Event Positions on the Surface of Nuclear Emulsions. E. W. Titterton and W. Barneveld. *Journal of Scientific Instruments*, v. 29, Aug. 1952, p. 250-251.

Describes a device which scribes a circle of chosen diameter on the surface of a nuclear emulsion above a particular event. Circles so marked can be seen with the naked eye in reflected light.

13517 An Automatic Thermal Analyses Recorder. R. L. Cunningham and W. P. Campbell. *Journal of Scientific Instruments*, v. 29, Aug. 1952, p. 252-253.

An inverse rate recorder is described which can detect thermal effects to within 0.2°C. Position of each line represents a set temperature, while length of the line represents time required for the sample to change from the previous temperature.

13518 The High Temperature Pirani Gauge. J. H. Leck. *Journal of Scientific Instruments*, v. 29, Aug. 1952, p. 258-263.

Operating conditions required for the above to operate in the pressure range 0-5 mm. Hg were investigated. A comparison of W and Pt wire for use as the gage element showed that both have disadvantages when operated above 450°K. Graphs and tables.

13519 A Simple Furnace Temperature Controller. M. Shepherdson. *Journal of Scientific Instruments*, v. 29, Aug. 1952, p. 263-264.

A two-position controller is described for use with a thermocouple or d.c. resistance bridge as a sensing element. The error signal operates a mirror galvanometer which controls the position of a spot of light on a photocell and this controls thermal relay which switches the power. The circuit is arranged to prevent overheating of the furnace. Diagrams.

13520 An Automatic Solenoid Operated Switch for Extending the Range of Electronic Recorders. T. L. Webb. *Journal of Scientific Instruments*, v. 29, Aug. 1952, p. 265-266.

Describes the above. Diagram of switch.

13521 A Simple Method of Determining the Azimuthal Orientation of Single Crystals With the Wissenberg Goniometer. D. S. Beard. *Journal of Scientific Instruments*, v. 29, Aug. 1952, p. 268.

Application of above in which only recognition of a principal row of lattice points is required.

13522 A Simple Conversion of an X-Ray Dose-Rate Meter Into an Integrating Dose-Meter. C. L. Smith. *Journal of Scientific Instruments*, v. 29, Aug. 1952, p. 269-270.

13523* Accuracy of the Vessel Method of Determining the Permeability of Paper and Foil to Water Vapor. (German.) Gerhard Schricker. *Kunststoffe*, v. 42, Aug. 1952, p. 229-231.

Brief discussion shows that above is tolerably accurate only within a low flow-rate range. Improved methods are indicated; data are charted and tabulated.

13524* Surface Profile Measurement Using the Microscope. S. Tolansky. *Laboratory Practice*, v. 1, p. 193-196.

The technique described can be used with magnifications ranging from 100 to 2000 and resolutions to ¼μ are obtainable. The method described is simple to apply, inexpensive, and nondestructive. It has the advantage of giving profiles over an extended area. Typical results illustrated.

13525* Some New Methods of Static Extensometry. H. de Leiris. *Microtecnic* (English Ed.), v. 6, Sept. 1952, p. 155-164. (Translated from the French.)

Treatment of problems of stress meansurement and particularly their static aspect, limited to description of some methods and their justification. Diagrams and photographs. 12 ref.

13526* The Dynamic Aspect of Measurements Using Balance Methods. Juline Loeb. *Microtecnic* (English Ed.), v. 6, Sept. 1952, p. 174-183. (Translated from the French.)

Deals with development of a rapid weighing design for use in industry. Diagrams and equations.

13527* The Low Down on Air Gaging. C. W. Kennedy. *Modern Machine Shop*, v. 25, Sept. 1952, p. 230-232, 234, 236, 238, 240, 242, 244, 246, 248, 250, 254, 256.

Explains operating principle, use, and care of air gaging equipment. Diagrams and photographs.

13528 Detection of Radiophosphorus in Cells and Spores of Fungi by Radioautography. A. M. Adams and J. J. Miller. *Nature*, v. 170, Aug. 9, 1952, p. 239.

Illustrated.

13529 A Method of Measuring and Grading Microscopic Spherical Particles. V. Timbrell. *Nature*, v. 170, Aug. 23, 1952, p. 318-319.

Brief description of instrument for the above, the principle of which consists of producing 2 identical co-planar images of each particle, the centers of which are separated by a variable distance.

13530* A Simple Automatic Counter. G. A. Shirn and E. S. Wajda. *Nucleonics*, v. 10, Sept. 1952, p. 30-31.

Describes, diagrams, and illustrates inexpensive system for automatically counting and recording radioactivity of many samples over long periods of time.

13531* Adaptation of an X-Ray Tube for Taking Electron Diffraction Photographs. Karl A. Davis and John E. Edwards. *Ohio Journal of Science*, v. 52, Sept. 1952, p. 255-257.

Briefly describes the above with emphasis on dual purpose tube and procedure. Diagram and photographs.

16. *Apparatus, Methods, and Standards*

13532 The Statistical Treatment of Experimental Data. A. Lord. *Journal of the Oil & Colour Chemists' Association*, v. 35, Sept. 1952, p. 437-447.

Two statistical techniques, the fitting of regression lines and the analysis of variance, are discussed. Use of proper estimate of error against which to appraise effect of a change of an experimental factor, or curvature of an experimental graph is emphasized. Tables. 12 ref.

13533* Cathode Ray Recorders for Missile Application. C. H. Schlesman. *Photographic Engineering*, v. 3, no. 2, 1952, p. 78-88.

Describes, diagrams, and illustrates multi-channel recorders for flight monitoring. Photographic recording from a 3 cathode-ray tube provides extreme flexibility and permits channel multiplexing with high-speed electronic switching.

13534 Long-Tube Method for Field Determination of Sound-Absorption Coefficients. Earle Jones and Albert London. *Journal of Research of the National Bureau of Standards*, v. 49, July 1952, p. 17-20.

A method of measuring sound-absorption coefficient of installed acoustic materials without defacing them. Includes equipment, theory, laboratory check of method, and field procedure.

13535* Principles and Recommendations for Standardization of Test Methods. (German.) E. Brandenberger. *Schweizer Archiv für angewandte Wissenschaft und Technik*, v. 18, July 1952, p. 233-238.

Summary of discussion at meeting of SVMT, May 23, 1952.

13536 A Tracer Method for the Thickness Measurement of Thin Bi Films. John J. Antal and A. H. Weber. *Review of Scientific Instruments*, v. 23, Aug. 1952, p. 424-426.

Describes above method which makes use of simple procedures and calculations. Other advantages include continuous calibration and the fact that the specimen remains unaltered. 14 ref.

13537 Instrument for Measuring Dynamic Viscosities and Rigidities. H. Markovitz, P. M. Yavorsky, R. C. Harper, Jr., L. J. Zapas, and T. W. DeWitt. *Review of Scientific Instruments*, v. 23, Aug. 1952, p. 430-437.

Describes instrument which is a modification of the Goldberg apparatus. It eliminates the necessity of operating at resonance and permits continuous measurements over a range of frequencies. Typical results are charted for a Newtonian liquid, a viscoelastic liquid, and a viscoelastic solid.

13538 Aligning Single Crystals for X-Ray Diffraction. L. S. Birks and A. B. Wing. *Review of Scientific Instruments*, v. 23, Aug. 1952, p. 442-443.

Describes a step-by-step procedure for optical alignment of above. Such alignment eliminates the necessity of the preliminary photograph for determining the final settings of the goniometer arcs in the Weissenberg or precession techniques.

13539 A Precise Gas Manometer. Lev Akobjanoff. *Review of Scientific Instruments*, v. 23, Aug. 1952, p. 447-448.

Discusses above which was constructed for use with a gas interferometer. This manometer had to be reliable one decimal beyond the readings of the interferometer itself, in which, when working with air, a shift of 550 fringes was observed for a drop of pressure of 770 mm.

13540* Experiments in Diffraction Microscopy. G. L. Rogers. *Proceedings of the Royal Society of Edinburgh*, v. 63, sec. A, pt. 3, 1950-51, p. 193-221.

Experiments were performed using optical methods to verify and extend the theory of Gabor's diffraction microscope. An elementary theory is given from which generalizations are drawn. Other confirmatory experiments are described. Diagrams and graphs.

13541* Automatic Control. Ernest Nagel. *Scientific American*, v. 187, Sept. 1952, p. 44-47.

A philosopher surveys the new ideas which engineers develop in the succeeding articles. The social implications of the dawning age of automatism are weighed; its potentials for human welfare assessed.

13542* Feedback. Arnold Tustin. *Scientific American*, v. 187, Sept. 1952, p. 48-55.

An outline of the basic theory of self-regulating processes. Diagrams.

13543* Control Systems. Gordon S. Brown and Donald P. Campbell. *Scientific American*, v. 187, Sept. 1952, p. 57-64.

A general discussion of the applications of feedback mechanisms. Some existing systems are described, possibilities for the future are explored, and next steps toward realizing these possibilities are indicated.

13544* The Role of the Computer. Louis N. Ridenour. *Scientific American*, v. 187, Sept. 1952, p. 116-118, 120-126, 128, 130.

Reviews properties of the analog and digital computer and considers their respective possibilities as control mechanisms. Block diagram and photographs.

13545* Information. Gilbert W. King. *Scientific American*, v. 187, Sept. 1952, p. 132-142, 144-148.

An analysis of the nature of information and its relation to feedback in the light of the powerful new theory of communication.

13546* Measurement of Thickness by Means of Radiation Methods. (German.) *Stahl und Eisen*, v. 72, July 31, 1952, p. 941-947.

Report consists of 4 articles: "Approximate Measurement of Thickness of Less Than 1 Mm. by Means of Beta-Rays", Adolf Trost; "Measurement of Thicknesses of up to Approximately 10 Mm. by Means of X-Rays and a Counting Tube", Hans Werner Fritze; "Measurement of Thicknesses of Approximately 10-100 Mm. by Means of Gamma-Rays and a Counting Tube", Wolfgang Kolb; and "Measurement of the Thicknesses of Nonferromagnetic Layers on Nonferromagnetic Bases by Means of Beta-Rays and a Counting Tube", Rudolf Berthold. Diagrams, graphs, and illustrations.

13547* How to Check Quality of Surface Finish. *Standardization*, v. 23, Aug. 1952, p. 228-242.

Introduction is followed by 3 articles: "The 'Why' of the Surface Finish Standards", James A. Broadston; "The Use of Standard Roughness Comparison Specimens", Donald E. Williamson; and "The 'Gold Standard' Precision Specimens of Surface Roughness", C. R. Lewis. Diagrams and illustrations.

13548* Instrumentation Studies. LXXXIII. A Summary of Instrumentation Reports Including the Technique of Evaluating Instruments. George R. Sears, Willmer A. Wink, and J. A. Van Den Akker. *Tappi*, v. 35, Aug. 1952, p. 156A-192A.

Includes a brief description of general methods used in evaluating paper-testing instruments or test methods, and a nontechnical summary of available instrumentation reports. 80 ref.

13549* New Precision Cameras for X-Ray Investigation of Microstructures. (German.) G. Freyer and Th. Lohmann. *Technik*, v. 7, Mar. 1952, p. 122-124.

New camera designs are discussed and illustrated. Typical results are also illustrated.

13550 Fluid Magnetic Clutch for Servomechanisms. G. A. Walters and A. P. Notthoff, Jr. *Tele-Tech*, v. 11, Sept. 1952, p. 90-91, 156, 158, 160-161.

Above, used extensively in airborne electromechanical systems shows increased current-torque time response with high-resistivity silicon iron of 40 micro-ohm-cm. Thixotropic lubricants augment stability, and labyrinth separators solve seal-deterioration problem. Diagrams and photographs.

13551 Computing With Servo-Driven Potentiometers. F. R. Bradley and R. D. McCoy. *Tele-Tech*, v. 11, Sept. 1952, p. 95-97, 189-190.

Briefly touches on important considerations involved in above, including material on the unload-problem and a discussion of most effective ways of using feedback amplifiers to achieve multiplication and division free of loading error. Diagrams and graphs.

13552* **Ultrasonic Techniques; Some Effects and Applications.** D. O. Sproule. *Times Science Review,* Autumn, 1952, p. 14-15.

An illustrated review. 16 ref.

13553 Statistical Evaluation of Rational and Stratified Methods of Sampling. Parts I and II. James V. Strela. *Tool Engineer,* v. 29, Aug. 1952, p. 37-40; Sept. 1952, p. 61-66.

Presents in simple terms the fundamentals of sampling in general and of 2 specific methods in particular. The methods discussed are statistical; their logic rather than their mathematical basis is emphasized. Describes the Thompson Sampling Machine and its operation. (To be continued.)

13554* **Using Membranes in Vacuum Technique.** (French.) Prugne and P. Garin. *Vide,* v. 7, May 1952, p. 1197-1199.

Describes some examples of use of soft membranes, also a method of gluing rubber membranes to metallic pieces. Includes schematic drawings.

13555* **Micromanipulators and Their Auxiliary Instruments. Instruments for High Precision Work Under the Microscope.** (German.) L. Otto. *Zeitschrift des Vereines Deutscher Ingenieure,* v. 94, Aug. 11, 1952, p. 754-760.

Describes various micromanipulators, their construction and operation. Application of the instruments and methods developed for medicine and biology, also for technical investigations, is indicated. Diagrams and photographs. 15 ref.

13556* **Principles of Spark Motion-Picture Photography.** (Concluded.) (German.) H. Schardin and E. Fünfer. *Zeitschrift für angewandte Physik,* v. 4, June 1952, p. 224-238.

Discusses light emission; types of gas-discharge; light sources and their circuit arrangements and sparking; and electrically operated split-second shutters and their use in high-speed daylight photographs. Graphs, tables, diagrams, and photographs. 16 ref.

13557* **Research on Surface Structures With the Aid of Adsorption and Catalysis.** (German.) E. Cremer. *Zeitschrift fur Elektrochemie; Berichte der Bunsengesellschaft fur Physikalische Chemie,* v. 56, no. 5, 1952, p. 439-446; disc., p. 446.

Theoretical and experimental discussion shows that catalytic reactions, adsorption isotherms, and the adhesiveness of powders are valuable aids to the study of surface structures of metallic and nonmetallic materials. Graphs, tables, and diagrams. 43 ref.

13558* *Zerstörungsfreie Materialprüfung.* Published by Gesellschaft zur Förderung Zerstörungsfreier Prüfverfahren e.V., Wildbad-Schwarzwald, Germany.

Abstracts and condensed reports of German and foreign publications on nondestructive materials testing. The Mar. issue consists of a bibliography on ultrasonic nondestructive testing of materials.

Miscellaneous Publications

13559 Method of Preparing Iron Powder. N. N. Alekseev. Henry Brutcher, Translation 2666, 1 page. (From *Zavodskia Laboratoriia,* v. 16, 1950, p. 256).

Brief note on a simple procedure for preparing iron powder such as is needed in magnetic-particle inspection (magnafluxing).

13560 The Standardization of Iron and Steel Industry Products and the Problem of Supplies. (French.) H. Meriel-Bussy. 14th International Mechanical Engineering Congress, June 1952, 19 pages.

1st section analyzes French standards for non-alloy steel. These standards are primarily related to the mechanical characteristics of these steels. In the 2nd section, mention is made of the work on simplification in France by the A.U.P.S. As an example, reference is made to semi-finished forgings. World unification and simplification of steel standards and quality is discussed. Tables.

13561 Comparison of Qualites of the Unalloyed Steels Used for Making Screws and Other Joining Members in Different Countries. (French.) G. Trichon. 4th International Mechanical Engineering Congress, June 1952, 11 pages.

Explains how screws, nuts, and rivets are made; and defines necessary qualities of the material. Sets forth the different designations of bolt-making steels, either in tables or in a summary of the symbols concerning special properties, heat treatment, method of manufacture, etc. Discusses universal symbolization of metals.

13562 Dynamics of Mechanical Feedback-Type Hydraulic Servomotors Under Inertia Load. Harold Gold, Edward W. Otto, and Victor L. Ransom. National Advisory Committee for Aeronautics, Technical Note 2767, Aug. 1952, 63 pages. (TL570 Un3t)

An analysis of the above is developed and experimental verification presented. Validity is demonstrated by means of recorded transient and frequency responses for 2 servomotors. The relations presented are readily applicable to design as well as to analysis of hydraulic servomotors.

Books

13563 Graphic Methods for Solving Problems. Frank A. Heacock. 113 pages. 1952. Edwards Brothers, Inc., Ann Arbor, Mich. (QA90 H34g)

Reading guide to recent literature on graphic methods as applied to the solution of technical problems in various fields of engineering, science, business and industry. Eight chapters of various graphic principles and methods explained and illustrated with typical examples. Bibliography of 660 ref. with abstracts of each.

13564 Electronic Analog Computers. (D-c Analog Computers) Ed. 1. Granino A. Korn and Theresa M. Korn. 378 pages. 1952. McGraw-Hill, New York. (QA75 K843Cop3)

Every step in the operation of d-c. analog computers, including repetitive computers, used as differential analyzers and equation solvers, is covered. In showing how to set up problems, the book emphasizes a procedure that overcomes the major source of errors in faulty assignment of scale factors. Explanations and data are illustrated by examples from industrial applications, including design of automatic pilots, linear and nonlinear servomechanism, solutions of oscillation problems, ballistic trajectories, and aircraft-flight equations. Design of computer installations for various industrial and scientific applications is fully covered. Footnote references and 4 page bibliography.

13565 Instrument Engineering. Vol. 1. Methods for Describing the Situations of Instrument Engineering. Ed. 1. Charles Stark Draper, Walter McKay, and Sidney Lees. 269 pages. 1952. McGraw-Hill, New York. (QA85 D79i)

Made up of contributions by the authors, their associates, and students, and based on theory from the fields of mathematics, classical physics, aeronautical engineering, mechanical engineering, electrical engineering, and chemical engineering. It presents, in an organized pattern, background knowledge and procedures required to solve all commonly occurring measurement and control problems. Suggested procedures are illustrated by typical examples. Differs from the usual textbook by building up in one volume a generalized pattern for describing physical situations, developing the background for associating solutions with these descriptions in a 2nd volume, and presenting a number of systematically selected examples in a 3rd volume.

13566 Quality Control Conference Papers, 1952. American Society for Quality Control, New York. 452 pages. 1952. (TS155 Am35c)

Comprises papers presented at the 6th annual convention, American Society for Quality Control, May 22-24, 1952, Syracuse, New York. Subjects of papers relate to: industries such as chemical, metallurgical, electrical, aircraft, food, automotive, textile, and pulp and paper; accounting and mathematical aspects; military standards, psychology; etc. Tables, charts, photographs, and references.

See also:

13060 (temperature control of the cupola)
13086 (ultrasonic process for maching metals and nonmetals)
13371 (testing of turbine rotors)
13735 (quality-control methods—control charts)
13737 (servomechanism design)
13744 (high-speed photography in design)

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14057 (frequency phase measuring device)
14063 (instrument electronics—signal-shaping circuits)
14076 (IBM-machine calculation of wave functions)
14121 (bibliography of flow through orifices and nozzles)
14157 (discharge-limitation circuit for G-M counters)
14192 (microwave spectroscopy at MIT)

17. METALS—FABRICATION AND USES

13567 Packard Marine Diesel Engines Feature Aluminum Construction and Interchangeability of Parts. Joseph Geschelin. *Automotive Industries*, v. 107, Sept. 1, 1952, p. 40-44, 80.
Presents basic specifications. Diagrams and photographs.

13568 Magnesium: Neglected Plane Material. H. Spencer Peterson. *Aviation Week*, v. 57, Sept. 1, 1952, p. 21-23, 25-27.
Discusses advantages for use in primary structures. Outlines Bureau of Aeronautics research program on problems involved. Mechanical properties and corrosion-preventive coatings are discussed.

13569 Alternative Materials. Murray C. Udy. *Battelle Technical Review*, v. 1, Aug. 1952, p. 84-88.
Describes various substitutes that may be used in place of certain strategic metals. Discusses conserving copper, alternatives for alloy steels, stainless steels, other conservation measures, plastics as alternative materials, and high-temperature materials.

13570* Examples of Industrial Application Based on the Properties and Characteristics of Nickel and Its Alloys. (Portuguese). Horace A. Hunnicutt. *Boletim da Associaçao Brasileira de Metais*, v. 8, Jan. 1952, p. 48-76.
Discusses pure or semi-pure Ni, alloys with high and low Ni content, and their application with respect to resistance to corrosion, resistance to heat, magnetic and electric effects, and improvement of their physical and mechanical properties. Includes photographs. 37 ref.

13571 Powder Metallurgy Parts in High Temperature Applications. Julius J. Harwood. *Materials & Methods*, v. 36, Aug. 1952, p. 87-91.
Discusses development and use of Cu-infiltered iron, Ti-alloy powders, sintered Al powder, Mo-base alloys, and "cermets". Shortages and service limitations of present high-temperature alloys are hastening their development. Tables and graphs show mechanical and oxidation characteristics. 10 ref.

13572 Tool Steels: Uses, Types, Treatments. T. C. DuMond. *Materials & Methods*, v. 36, Aug. 1952, p. 113-128.
Special report covers classes of toolsteels, factors in selecting proper toolsteel, and heating and heat treatment procedures.

13573 Selection of Steel for Automobile Parts. A. L. Boegehold. *Metal Progress*, v. 62, Sept. 1952, p. 67-71.
Discusses the hardenability aspect in above. Graphs show cross-sectional hardness and strength of axles after heat treatment, compared with theoretical stress distribution; and results of torsion and fatigue tests on 11 carbon or alloy steels. Schematic relationship of end-quench hardenability test to cooling transformation diagram for SAE-8630 steel is shown.

13574 Substitution of Straight Chromium Stainless Steels for Chromium-Nickel Types. John Parina, Jr. *Metal Progress*, v. 62, Sept. 1952, p. 97-101.
A series of brief articles as follows: "Established Uses of Straight Chromium Stainless Steels", F. K. Bloom; "N.P.A. Regulation M-80 Lists Many Approved Uses for Chromium Stainless", G. A. Sands; "Limited Uses of Type 400 Steels Laid to Lack of Incentives", Elmer Gammeter; "Urges Wider Use of Chromium Stainless Alloys", E. C. Wright; "Many Uses Where Corrosive Conditions Are Not Severe", R. Hunter; "Substitutions Based on Knowledge of Metal and Application Are Successful", D. W. Kaufman; "Fabricating Difficulties Being Overcome", W. F. Hodges; and "Successful Fabrication Depends on Correct Technique", C. B. Tupholme.

13575 Aircraft Industry Takes a Cautious Attitude. *Metal Progress*, v. 62, Sept. 1952, p. 105-109.
Series of brief articles on stainless steels in the aircraft industry: "Aircraft Maker Collecting Data on Service Life", A. E. Leach; "Polish and Plate to Prevent Development of Rust", J. W. Sweet; and "High Corrosion Resistance of Chromized Coatings", T. P. Hoar. Includes table of heat-treating temperatures of wrought Cr-Fe alloys.

13576 420 and 431 in British Engines. C. A. Dalton. *Metal Progress*, v. 62, Sept. 1952, p. 109.
Briefly describes the use of above stainless steels in British aircraft engines.

13577 Chromium-Iron Castings. *Metal Progress*, v. 62, Sept. 1952, p. 112-113.
Two articles as follows: "Substitution of 18-8 Types With Straight Chromium Alloys for Castings", R. J. Wilcox; and "2% Ni is Good for High Chromium-Iron Alloys", Harvey T. Harrison. Mechanical properties and corrosion resistance are discussed.

13578 The Chemical Industry Can Extend Applications. *Metal Progress*, v. 62, Sept. 1952, p. 113-114.
Three short articles on straight-Cr stainless steels: "Chemical Industry's Experience is Reasonably Satisfactory", L. R. Honnaker; "Does Not Contaminate Mildly Corrosive Solutions", M. H. Brown; and "Gives Adequate Service in Nitric Acid and Ammonia Plants", R. A. Byorum.

13579 Selecting the Right Journal Bearing Materials. E. H. Scott, Jr. and E. R. Booser. *Product Engineering*, v. 23, Sept. 1952, p. 119-126.
Analysis of commonly used journal-bearing materials with respect to compatability, embeddability, corrosion resistance. fatigue strength, cost, and availability. 10 ref .

Miscellaneous Publications

13580 Different Applications of Alloy Steels for Jet Engines. (French.) Giancarlo Anselmetti. 4th Internationl Mechanical Engineering Congress, June 1952, 9 pages.
Discusses types of application, depending upon the temperature to which the alloys are exposed: weakly alloyed (pearlitic) mild steels for turbine discs, austenitic steels for jet engine accessories exposed to temperatures above 550°C., and special alloys, such as the "Nimonics" for turbine blades. Tables show the composition of pearlitic steels, their mechanical properties at room temperature, coefficient of expansion, and specific gravity at elevated temperatures.

13581 Light-Weight Steel Design in High-Duty Service Tower Construction. (German.) Erich Bahke. 4th International Mechanical Engineering Congress, June 1952, 11 pages.
Diagrams and describes changes which become necessary when using light steels, and which led to the development of a new style in this type of construction. Photographs.

13582 The Development of Gray Irons. High Strength Irons. (French.) M. Ballay. 4th International Mechanical Engineering Congress, June 1952, 17 pages.
Describes the available gray irons and their strength and shock resistance. Discusses in particular alloyed and nonalloyed gray iron, gray iron with spheroidal graphite, and the resistance of these various types to wear and friction. Tables.

13583 Beryllium Alloys in Engineering. Walter Deisinger. 4th International Mechanical Engineering Congress, June 1952, 9 pages.
Discusses historical development; mechanical and physical properties of pure Be, and of Cu-Be, Ni-Be, and some other Be alloys; and applications. Constitution diagram for CuBe. Tables, graphs, and photographs.

13584 Clad-Steel Sheets and Their Application in Chemical Engineering. Heinrich Canzler. 4th International Mechanical Engineering Congress, June 1952, 12 pages.
Discusses above, briefly considering manufacturing process, base metal and cladding materials, mechanical and thermal properties, welding, and design and economic considerations. Photographs and construction diagrams for various apparatus.

13585 Modern Requirements of Alloy Steels for the Manufacture of Antifriction Bearings. (French.) Dauide Giaccone. 4th International Mechanical Engineering Congress, June 1952, 15 pages.

Reviews defects encountered in Cr steel for ball and roller bearings which constitute an obstacle to completion of the manufacturing processes involved. Mention is made of impurities and attention is focused on lamination defects. Photomicrographs.

13586 Aluminium for Cables. Karl-Heinz Hahne. 4th International Mechanical Engineering Congress, June 1952, 15 pages.

Primarily describes the manufacture of Al cables, with emphasis on the method of applying Al sheaths. Details for the latter are given especially for the Balgen sheath. Mentions use of outer plastic coating for corrosion prevention. Diagrams, photographs, table, and graph.

13587 The Development of Gray Cast-Iron as a Constructional Material. (German.) E. Piwowarsky. 4th International Mechanical Engineering Congress, June 1952, 8 pages.

Discussion of above, including advantages, mechanical properties, constructional features, and applications.

13588 Some Factors Determining the Choice of Materials and Methods for Mass Production of Non-Ferrous Details. B. Starck. 4th International Mechanical Engineering Congress, June 1952, 10 pages.

General discussion, main topics are: dependence of manufacturing costs on workability (covers castings, extruded sections, forgings, and machining); manufacture of a high-speed brass valve housing as an example of suitable application of good workability of nonferrous material; dependence of material costs on properties (with diagrams of rupture details of Al castings); and dependence of material costs on workability. Materials discussed include alloys of Mg, Al, Cu, and Zn. Photographs.

13589 Gears for Traction Motors. C. Thielers and S. G. Klemming. 4th International Mechanical Engineering Congress, June 1952, 9 pages.

Deals with selection, machining, and heat treatment of steels for the above. Diagrams and graphs.

See also:

13114 (powder-metallurgy applications of nonferrous metals)
13115 (sintered Al—Applications)
13135 (applications of stainless tubing)
13138 (uses of Cu-stainless laminate)
13149 (alloy steels for automotive use)
13306 (new Mg alloy for jet engines)
13322 (applications of high-strength cast iron)
13350 (Cr-Cu-Ni steels for low-temperature service)
13352 (metals in aircraft at low temperatures)
13364 (applications of Boron steels)
13365 (German boiler steels)
13373 (uses of sintered parts)
13377 (Hastelloy D for chemical process equipment)
13679 (metal-ceramic composites)
13724 (sintered friction materials)
13725 (production and use of self-lubricating bearings)
13741 (metal gaskets—properties and uses)
13953 (applications of metal-plastic combinations)
14224 (use of Sn as a coating)
14243 (application of Cu-clad Al)
14253 (applications of nodular cast iron)

18. POLLUTION AND WASTES

13590* The Atmospheric Pollution Problem in Canada. Morris Katz. *Chemistry in Canada*, v. 4, Aug. 1952, p. 137-144.

Describes the nature of the atmospheric pollution problem in some smelting districts and urban areas. Close cooperation in scientific effort is illustrated by the present situation in the Windsor-Detroit area. Discusses effects of pollution on vegetation and health, and considers various control methods and emission standards.

13591* Radioactive Contamination, Continuing Problem in Water Supply Engineering. Roy J. Morton. *Civil Engineering*, v. 22, Sept. 1952, p. 138-141.

Illustrated discussion on above problem. Tables. 27 ref.

13592 Series Dust-Collector Installations on Large Pulverized Coal Boilers. L. W. Cadwallader. *Combustion*, v. 24, Aug. 1952, p. 47-49.

Data covering experience, performance, capital expenditures, and operating costs of mechanical and electrostatic dust-collection installations at the Buzzard Point and Potomac River steam-electric generating stations serving Washington, D. C.

13593 Treatment of Radioactive Wastes. W. K. Eister. *Heating and Ventilating*, v. 49, Sept. 1952, p. 81-83.

Discussion of the various kinds of radioactive wastes and methods for their disposal.

13594 Industrial Air Pollution: Easier to Control Than to Regulate. Harry E. Clo. *Heating, Piping, and Air Conditioning*, v. 24, Sept. 1952, p. 114-115.

Discusses in general, sources of some contaminants, possible methods of control, and equipment available at reasonable cost and with reasonable maintenance for attaining control.

13595 Drying Operations and Atmospheric Pollution. A. M. Lane. *Industrial Heating*, v. 19, Aug. 1952, p. 1479-1483. (A Condensation.)

The problem of atmospheric pollution which occurs during various drying operations is reviewed.

13596* Autoradiographic Method for Identifying Beta-Active Particles in a Heterogeneous Mixture. Philip D. LaRiviere and Stephen K. Ichiki. *Nucleonics*, v. 10, Sept. 1952, p. 22-25.

Radioactive particulate matter produced by abrasion or grinding can be observed and measured directly using a new method for checking air samples. It is especially applicable to ventilation and exhaust-control studies.

13597* Radioactive Waste Disposal to Public Sewers. F. W. Kittrell. *Sewage and Industrial Wastes*, v. 24, Aug. 1952, p. 985-993.

The AEC's allocation and visitation program for control of potential radiation hazards due to off-Commission use of reactor-produced radioisotopes is described briefly. Sample calculations, based on allocations or shipments of radioisotopes and sewage volumes for Kentucky and Tennessee cities are given. Tables and graphs.

13598* Rag, Rope, and Jute Wastes From Specialty Paper Mills. V. Treatment by Aeration. Willem Rudolfs and N. L. Nemerow. *Sewage and Industrial Wastes*, v. 24, Aug. 1952, p. 1005-1014.

Miscellaneous Publications

13599 Air Pollution. Glenn Warner. *Proceedings of the Railway Fuel and Traveling Engineers' Association*, v. 15, 1951, p. 171-176. (TJ607 R13a)

General discussion directed toward a better understanding of the above problem by government, public, etc. Stresses fallacy of smoke control based upon visual particles.

See also:

13046 (purification of cupola fumes)

19. FUEL TECHNOLOGY

13600 Pressure-Gas Oxygen Coal Gasifier. C. G. Von Fredersdorff and E. J. Pyrcioch. *American Gas Association Monthly*, v. 34, Sept. 1952, p. 33-35, 46-47.

Describes and diagrams research pilot plant for continuous production of base or synethesis gas from low-cost coal. Typical results tabulated and discussed.

13601* Research on the Softening, Swelling, and Expansion of Bituminous Coals. (German.) A. P. Oele. *Brennstoff-Chemie*, v. 33, July 23, 1952, p. 231-238.

Discusses experimental observations on the nature and composition of bituminous coals and on phenomena occurring during

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the heating and distilling of such coals. Tables, graphs, and photomicrographs. 17 ref.

13602* The Reactivity of Carbon. (German.) W. F. K. Wynne-Jones, H. E. Blayden, and H. Marsh. *Brennstoff-Chemie,* v. 33, July 23, 1952, p. 238-241.

Discusses the reaction of carbon with oxidizing gases as part of a study of the factors which determine the reactivity of this element. Includes consideration of structure and true surface of carbon; adsorption of gases; source of carbon; and effect of catalysts, time, temperature, and pressure. Graphs and tables. 10 ref.

13603* Some Recent Insights Into The Chemical Structure of Coal. (German.) D. W. van Krevelen. *Brennstoff-Chemie,* v. 33, Aug. 20, 1952, p. 260-268.

Describes a graphical-statistical method of using the atomic H/C and O/C ratios of mineral coal in presenting characteristic carbonization values of the petrographic components, the most important reactions of coal and qualitative structure changes. Using density or specific volume it is possible to compute the percentage of carbon in aromatic and nonaromatic form. Graphs and tables. 12 ref.

13604* Magnetic Studies of Carbon and of Coking. (German.) W. F. K. Wynee-Jones, H. E. Blayden, and R. Iley. *Brennstoff-Chemie,* v. 33, Aug. 20, 1952, p. 268-273.

Deals with magnetic susceptibility tests of typical graphites and carbon forms made to study details of their structures. Tables and graphs. 13 ref.

13605* Swelling Pressures in the Coke Oven. *Coke and Gas,* v. 14, Aug. 1952, p. 280-284, 288.

Describes and discusses work on the above reported at the annual meeting of the British Coke Research Association. Diagrams, tables, and graphs.

13606* Carburetted Water Gas Manufacture From West Australian Sub-Bituminous Coal. R. P. Donnelly, F. J. Taylor, and R. Broadbent. *Gas Times,* v. 72, Aug. 22, 1952, p. 217-218, 223-225.

Report of the above with a diagram of apparatus.

13607* Vapour and Air Release From Aviation Fuels. L. D. Derry, E. B. Evans, B. A. Faulkner, and E. C. G. Jelfs. *Journal of the Institute of Petroleum,* v. 38, July 1952, p. 475-515; disc., p. 515-525.

Shows that consequences of above on change of altitude are loss of fuel, difficulty in providing venting capacity to prevent excessive pressure in the tanks, and bumping and foaming. Graphs and tables.

13608 Experimental Evidence for Anomalous Population Temperatures of OH in Flames. S. S. Penner. *Journal of Chemical Physics,* v. 20, Aug. 1952, p. 1334-1335.

Presents brief evaluation of experimental evidence for and against the above.

13609 A Two-Path Method for Eliminating the Effects of Self-Absorption on Temperatures for Isothermal Flames. S. S. Penner. *Journal of Chemical Physics,* v. 20, Aug. 1952, p. 1341-1342.

Described method is valid for isothermal systems and spectral lines with Doppler contour. All errors arising from self-absorption are eliminated.

13610* The Nature of Coal Bitumens—Viscosity & Molecular Weight of Coal Degradation Products. H. S. Rao, A. N. Basu, and A. Lahiri. *Journal of Scientific & Industrial Research,* v. 11B, June 1952, p. 234-239.

An investigation of applicability of Staudinger's equation in reference to above. Materials examined were classified into 2 series having proportionality constants of 5.31 and 2.77×10^{-5}. Tables and graphs. 12 ref.

13611* Studies on the Desulphurization of High-Sulphur Indian Coals. M. N. Goswami and Monmohan Roy. *Journal of Scientific & Industrial Research,* v. 11B, June 1952, p. 239-241.

Describes how desulphurization of Assam coal can be effectively brought about by carbonizing a mixture of the coal with silica. 18 ref.

13612 Twin Flames. W. G. Berl and D. Dembrow. *Nature,* v. 170, Aug. 30, 1952, p. 367.

Reports of some studies on the effect of fuel additives on the laminar flame velocity of hydrocarbons burning in air at atmospheric pressure.

13613* Characteristics of the Combustion of Methane in Relation to Its Use in Domestic Appliances. (Italian.) C. Padovani and E. Raimondo. *Rivista dei Combustibli,* v. 6, June 1952, p. 363-376.

Physical and combustion properties of methane are examined in comparison with those of manufactured gas. Particular attention is given to differences in heat value and in flame speed.

13614* Turbulent Diffusion With Gas and Pulverized Coal Burners. Kenjiro Saji. *Rock Products,* v. 55, Aug. 1952, p. 152-154.

Relationship between flame length or comubsion rate and nozzle velocity and diameter were studied. Comparison of pulverized coal flames with gas flames points to effects of turbulence.

13615* Improved Yield of Peat From "Hydro-Peat" Drying Fields. (Russian.) M. Ia. Riabchikov. *Torfianaia Promyshlennost,* v. 29, Mar. 1952, p. 6-8.

Discusses improvements since 1945 in field drying of peat in the Chernoramensk Region.

13616* Preparation of Surfaces of Drying Felds for Mechanical Harvesting of "Hydropeat". (Russian.) V. A. Nikiforov. *Torfianaia Promyshlennost,* v. 29, Mar. 1952, p. 8-10.

Describes equipment and methods of operation of the above.

13617* Schemes for Drying Excavated Peat in the Peat Industry of the Sverdlovsk Peat Trust. (Russian.) N. I. Khoroshavin. *Torfianaia Promyshlennost,* v. 29, May 1952, p. 15-16.

Discusses variations of field drying in relation to weather conditions. Data are tabulated.

13618* The Problem of Drying Lump Peat by Use of Multiple-Layer Piles. (Russian.) V. F. Kazarinov and I. D. Sokolor. *Torfianaia Promyshlennost,* v. 29, July 1952, p. 27-30.

Discusses various aspects of drying. Data from a series of test piles are tabulated.

Miscellaneous Publications

13619 Process Variables and Oil Selection for High Btu Oil Gas Production. H. R. Linden. American Gas Association, Proceedings, v. 33, 1951, p. 553-575. (TP700 Am35p)

Study of thermal gasification of typical gas-making oils under operating conditions simulating present and anticipated high Btu. oil gas manufacturing practice using a 2½ inch diameter laboratory cracking tube. Various operating variables considered, and these and oil properties correlated with recovery, yield, and other data. Nomographs, tables, and diagrams.

13620 Recent European Developments in the Use of Oxygen in Gas Manufacture. L. L. Newman. American Gas Association, Proceedings, v. 33, 1951, p. 585-590. (TP700 Am35p)

Block and other diagrams. 13 ref.

13621 Demonstration Plant for Coal Gasification by the "Panindco" Process. American Gas Association, Proceedings, v. 33, 1951, p. 616-621. (TP700 Am35p)

Describes French demonstration plant built to produce synthesis gas for the synthesis of ammonia, methanol or hydrocarbons or lean gas for heating purposes. Performance data, flowsheet, and photograph.

13622 The Underfiring of Coke Ovens With Unusual Gases. Charles R. Locke. American Gas Association, Proceedings, v. 33, 1951, p. 670-682. (TP700 Am35p)

Reviews facts on use of mixtures of natural gas with producer gas or air and brings up to date the procedures shown effective in above operation at the plant of The Peoples Gas Light and Coke Co., Chicago.

13623 Tar Seam, Plastic Zone, and Coking Velocity. H. Terbeck. Henry Brutcher, Translation 2689, 11 pages. (From *Glückauf*, v. 81-84 no. 19-20, 1948, p. 327-330.)

Discussion of above including definitions, theory, and diagrammatic expressions for widening of plastic zone.

13624 Minimum Ignition Energies of Six Pure Hydrocarbon Fuels of the C_2 and C_6 Series. Allen J. Metzler. National Advisory Committee for Aeronautics, Research Memorandum E52F27, Aug. 11, 1952, 22 pages. (TL782 Un3rm)

Above at reduced pressures are reported for ethane, ethylene, acetylene, n-hexane, cyclohexane, and benzene. A relation between ignition enregy and maximum flame velocity is also presented. Tables, diagrams, and graphs.

13625 Coal Steam Locomotives. C. M. Moddrell. *Proceedings of the Railway Fuel and Traveling Engineers' Association*, v. 15, 1951, p. 51-56. (TJ607 R13a)

Chiefly in relation to fuel efficiency discusses: cold-water method of cooling locomotive boilers; improvements in drafting and steaming; ash pans; and coal.

13626 Locomotive Fuel Oil. T. J. Conway. *Proceedings of the Railway Fuel and Traveling Engineers' Association*, v. 15, 1951, p. 57-60; disc., 60-68. (TJ607 R13a)

Briefly: history, advantages, properties. Chiefly, short account of research program of Southern Pacific Co. at Battelle Memorial Institute and elsewhere on development of improvements in the combustion system for oil burners. 8 pages of discussion.

Books

13627 Proceedings of the United Nations Scientific Conference on the Conservation and Utilization of Resources. Vol. III. Fuel and Energy Resources. 330 pages. 1951. Department of Economic Affairs, United Nations, New York. (HC13 Un3p)

Subjects covered include: oil and gas discovery and production; oil chemistry; coal mining, preparation, gasification and carbonization; fuel conservation; integrated power system; and new developments in production and utilization of energy.

See also:
12996 (briquettes for electric smelting Fe ores)
13643 (combustion in furnaces—book)
14217 (coal in Canada—1951)

20. HEATING, DRYING, AND AIR CONDITIONING

13628* Testing in Domestic Appliance Research. *B.C.U.-R.A. Quarterly Gazette*, Dec. 1952, p. 6-9.

Briefly describes instruments for testing heating applicanes to increase efficiency of fuel combustion, and to decrease amount of smoke emission and flow of cold air through the appliance.

13629 Blowing Engine Selection: The Matching of Blowing Engines to Blast Furnace Requirements. G. A. Flint and J. G. Lee. *Blast Furnace and Steel Plant*, v. 40, Sept. 1952, p. 1070-1075.

Based on British experience, answers various questions on the above especially in view of current theoretical ideas on the gas turbine driven blower. Tables and diagrams. (To be continued.)

13630 The Production and Distribution of Steam, With Special Reference to the Ceramic Industry. E. Griffiths. *Transactions of the British Ceramic Society*, v. 51, Aug. 1952, p. 409-423; disc., p. 423-427.

Describes reasons why steam is favored in industry as a heating medium, and types of boilers in use, their relative efficiencies and characteristics. Attention is also drown to the advantages of auxiliary equipment. Three case histories.

13631* Parry Dryer. R. L. Morrisson. *Canadian Mining Journal*, v. 73, Aug. 1952, p. 66-70.

Tells how the fluidized-solids technique was successfully applied to drying of fine coals with low energy and labor costs, resulting in a high grade of product. Developed on a commercial scale at a Canadian colliery, the machine suggests applications in similar problems involving wide ranges of other materials. Schematic diagrams of Dryer. Graphs.

13632* Calculation of Heat Exchangers and Their Characteristic X-Numbers. (French.) J. Szczeniowski. *Chaleur et Industrie*, v. 33, July 1952, p. 209-212.

Outlines application of theoretical data to calculation of actual cases. Graphs.

13633* Investigations on Cooking Burners of Household Ranges, With Particular Emphasis on Rates of Ignition. (German.) Agathe Kühner. *Gas- und Wasserfach*, v. 93, Aug. 1, 1952, p. 425-433.

Describes and diagrams experimental apparatus for the above. Tables give composition of various gases investigated, rate of ignition in dependence on flow pressure, and security factors as function of amount of flow, surface of burner openings, and rate of ignition.

13634 Thermal Characteristics of Ceramic Houses. Wayne E. Long. *Heating and Ventilating*, v. 49, Sept. 1952, p. 77-80.

Discussion on the heat flow through the walls of 6 Texas "test" houses.

13635 Factors Affecting the Efficient Burning of Oil. R. W. Olsen and C. M. Toelaer. *Heating and Ventilating*, v. 49, Sept. 1952, p. 88-101.

Discussed basic principles of the combustion of oil, the various components of the furnace or boiler, and the role these parts play in the combustion process.

13636 Theory vs. Practice in Radiant Heating. (Concluded.) T. Napier Adlam. *Heating and Ventilating*, v. 49, Sept. 1952, p. 111-113.

Describes importance of suitable floor temperatures and the exercise of care in system design.

13637 Radiant Heating, Cooling. Gunnar Frenger and Dudley W. Day. *Heating, Piping, and Air Conditioning*, v. 24, Sept. 1952, p. 88-91.

A brief and general description of above with mention of installation and appearance.

13638 Far Infrared Used as a Heat Source for Various Applications. *Industrial Heating*, v. 19, Aug. 1952, p. 1469-1470, 1472, 1474, 1476.

Many baking, degreasing, curing, preheating, and similar jobs have been speeded-up by the comparatively new far-infrared radiant heaters. This rather different heat source radiates its energy in the almost invisible "far-infrared" portion of the spectrum. Advantages over conventional infrared are discussed. Typical installations are described and illustrated.

13639 Self-Baking Electrodes Spur Development of Bigger, Better Furnaces. M. O. Sem. *Iron Age*, v. 170, Aug. 28, 1952, p. 95-99.

Describes larger, simpler, and improved electric furnaces which have resulted in Europe from reliable operation of continuous, self-baking electrodes. Mechanically charged open smelting furnaces have been designed with swingable, charging chutes in capacities of 30,000 kw. Covered furnaces permit collection of waste gases for further use in the plant, in some cases for burning limestone. The rotating-hearth furnace has proved its worth in production operations. Savings in both coke and limestone have been reported for an 18,000-20,000 kw. unit installed in Sweden. Lower electrode consumption and cleaner operation are claimed. Diagrams and illustrations.

13640* Spreader Stokers and Flyash Reinjection. Herbert L. Wagner. *Paper Trade Journal*, v. 135, Aug. 29, 1952, p. 19-24, 26, 28.

Detailed description and diagrams of the Detroit RotoGrate stoker which is of the continuously cleaned type.

13641* Modern Design Principles in Pyro-Processing. Part III. Cooling Systems. Wolf G. Bauer. *Pit and Quarry*, v. 45, Sept. 1952, p. 101-104.

Discussion of the above includes cooling needs and mediums; and recuperating cooling and possibilities. Diagrams.

20. *Heating, Drying, and Air Conditioning*

13642* Develop Fuel Oil Additives to Reduce Troublesome Slagging on Boiler Tubes. *Plant*, v. 6, Sept. 1952, p. 58-59.

Describes development of powdered-alumina composition which is suspended in the fuel oil. It changes the composition of ash deposits on boiler tubes from a hard-to-clean, glassy coating to a powdery substance which can be removed readily by lancing without shutting down the boiler. Results of both laboratory and field tests are described.

Books

13643 The Science of Flames and Furnaces. M. W. Thring. 416 pages. 1952. Chapman & Hall, Ltd., London. (TJ320 T41s)

Knowledge of fluid flow, combustion, and heat transfer that physics and chemistry have made available to furnace designers and engineers is presented in such a way that it may readily be applied in the design of any flame-treated furnace. The book should be of greatest use to designers, builders, and users of furnaces in the metal, glass, and ceramics manufacturing industries. and to all others concerned with flame-heated furnaces. Diagrams, tables, and footnote references.

See also:
13613 (methane in domestic heating appliances)
13654 (gas turbine in relation to fuel economy)
14060 (heat transfer through thermal insulators)

21. PRIME MOVERS

13644* Proteus 3 Derivation. S. G. Hooker. *Aeroplane*, v. 83, Aug. 8, 1952, p. 192-193.

Redesigning of the above aircraft gas-turbine engine in which desirable mechanical features were retained, some simplification, and new aerodynamic features incorporated. Comparison illustrations of old and improved parts.

13645* Some Notes on Centrifugal Compressors. L. N. Thompson. *Aircraft Engineering*, v. 24, Aug. 1952, p. 231-233.

Derivation of basic theory and some comparisons with axial machines.

13646* Determination of the Ignition Point in Combustion Motors. (German.) R. Gauger. *Archiv für Technisches Messen*, Aug. 1952, p. 183-186.

Reviews the above on the basis of literature. Discusses means of measuring this point, process of gas analysis, temperature measurement with a contact thermometer, and plotting the course of pressure. 41 ref.

13647* Engine Performance: An Analysis in Terms of Inlet Manifold Conditions. J. G. Lavender and C. R. Webt. *Automobile Engineer*, v. 42, Aug. 1952, p. 293-299.

Investigations were made on a small 4-cylinder engine in order to determine relationship between mixture flow, manifold depression, and temperature. A general theoretical analysis is presented, and test results for the particular engine investigated are compared with this analysis.

13648 Analyzing Ignition Problems of Piston and Jet Engines. *Automotive Industries*, v. 107, Sept. 1, 1952, p. 46-49, 84, 88, 90.

Three articles, including introduction by Thomas MacNew; "Improvements in Jet Engine Ignition Systems", by S. E. Gregaire: and "Analyzation of the Creepage-Gap Ignition System", by Tullio Tognola. Diagrams.

13649 The Oxidation, Decomposition, Ignition, and Detonation of Fuel Vapors and Gases. XXI. Nuclear Ignition as Illustrated by the Characteristics of Compression and Spark Ignition; Pentane, Hexane, and Heptane as Engine Fuels. R. O. King, E. J. Durand, A. B. Allan, E. J. T. Hansen, and V. E. Bowen. *Canadian Journal of Technology*, v. 30, Sept. 1952, p. 222-257.

Above investigations were carried out in a C. F. R. engine used as a compression ignition machine. Additional work is suggested. Graphs and tables.

13650 Atomic Energy. When? Where? How Much? *Chemical and Engineering News*, v. 30, Sept. 15, 1952, p. 3808-3815.

Results of a question and answer interview with Lawrence R. Hafstand, Director of Reactor Development, Atomic Energy Commission, in which was given the Government's story of what has been and is being done in reactor development and how it will affect the power situation tomorrow.

13651* Turbochargers for Automotive Engines. *Diesel Power and Diesel Transportation*, v. 20, Aug. 1952, p. 42-43.

Discusses advantages and limitations of the above. Describes work of Elliott Co. and of Cummins Engine Co. Includes performance curves.

13652* Developing the Pulse Generator. Sidney Miller. *Diesel Power and Diesel Transportation*, v. 20, Aug. 1952, p. 54-58. (A condensation.)

Describes development of above for ignition of modern gas engines. Advantages and limitations of 3 types. Diagrams and illustrations.

13653 Wind Tunnel Investigations on Rotating Blades of Aerofoil Section. K. H. Khalil. *Engineer*, v. 194, Aug. 15, 1952, p. 221-223.

Describes results of investigations on pressure distributions around airfoil section blades rotating in a wind tunnel.

13654* The Gas Turbine in Relation to Fuel Economy. Karrer. *Engineer*, v. 194, Aug. 29, 1952, p. 274-277.

Describes several methods of combining gas turbine and steam cycles in a single installation. These combinations either use exhaust gases of the gas turbine as combustion air in the steam boiler, or employ boiler flue gases in heat exchanger to heat or partially heat gas turbine fluid. Diagrams.

13655* Performance of a 1,000-KW Gas-Turbine. *Engineering*, v. 174, Aug. 1, 1952, p. 138-140.

Performance curves and illustrations show characteristics of above equipment built for the British Royal Navy.

13656* The Problem of Minimum Richness of Operating Mixtures in Internal Combustion Engines With Carburetors. (Russian.) E. A. Chudakov. *Doklady Akademii Nauk SSSR*, new ser., v. 84, May 21, 1952, p. 495-497.

The influence of richness of fuel mixtures on fuel economy and ignition was studied. Data are charted.

13657* An Experimental Investigation Into Pre-Ignition in the Spark-Ignition Engine. D. Downs and J. H. Pegneguy. *Institution of Mechanical Engineers, Proceedings* (Automobile Div.), pt. 4, 1950-51, p. 125-139; disc., p. 140-149.

Describes and investigates pre-ignition ratings of various fuels. Two methods of obtaining those ratings were developed; with one a 500 c.c. single-cylinder water-cooled is used, having an electrically heated hot-spot to induce pre-ignition, and with the other a single-cylinder air-cooled aircraft engine with an air-cooled pre-igniter is used. A large number of pure fuels from the paraffin, napthene, aromatic, and alcohol groups were rated for pre-ignition tendency and temperature of the hot-spot with normal running and with pre-ignition conditions was established. Effects of engine variables were studied, in addition to effects of important fuel additives. 22 ref.

13658* An Analytical Approach to Automobile Valve Gear Design. J. L. H. Bishop. *Institution of Mechanical Engineers, Proceedings* (Automobile Div.), pt. 4, 1950-51, p. 150-157; disc., p. 157-160.

A general mathematical analysis of the conventional 3-arc cam is presented, introducing the terms "eccentricity" and "instantaneous radius". This is followed by a similar analysis of the new cam profile using the same terms, together with a method of correcting the cam profile for high-speed operation. Effects of the new cam profile on horsepower and thermal efficiency are shown; effect of acceleration characteristic on valve-spring design also is illustrated.

13659 How to Figure Heat Rates of Big Modern Turbines. *Power Engineering*, v. 56, Mar. 1952, p. 64-65, 96.

Tells how to estimate and calculate heat rates, throttle and condenser flows, extraction for feedwater heating, turbine efficiencies, and expansion lines, and, in general, predict turbine performance with practical accuracy for units installed since

1941 and units up to 200,000 kw. projected for future. Data are given for steam conditions up to 2400 psig., 1100°F., 1.5 in. Hg abs. and for both reheat and non-reheat units in capacities up to 200,000 kw. Graphs.

13660* Ignitron Locomotives Turn in Good Performance Records. C. C. Whittaker and W. M. Hutchison. *Railway Mechanical and Electrical Engineer*, v. 126, Sept. 1952, p. 63-65, 74.

Presents operating data on new type of electric locomotive, in use since Nov. 1951, for freight service on the Pennsylvania R. R. Its single-phase a.c. power from the overhead trolley is rectified by means of sealed Ignitron tubes, and the d.c. output of the rectifier is supplied to series-wound, d.c. traction motors. Thus, the economies possible with an a.c. trolley system and the tractive advantages of d.c. motors are combined in the same locomotive.

13661* Slip Processes Between Pistons and Races of Revolving-Piston Compressors. (German.) Albert Vogel. *Technik*, v. 7, Mar. 1952, p. 119-121.

A diagram and graphs illustrate mathematical method of determining above.

13662* The Advantages of the Valve Control in Fast Steam Locomotives. (German.) O. Günther. *Zeitschrift des Vereines Deutscher Ingenieure*, v. 94, Aug. 1, 1952, p. 735-742.

New valve control is characterized by a large expansion stroke and correspondingly small compression stroke. It increases the efficiency of the locomotive 8-10% and reduces the consumption of cylinder oil by an average of 23%. Drawings, graphs, and tables.

13663* Trajectories of Pilot-Beam Rockets With Gas-Flow Control. (German.) Eduard Perret, Ernst Roth, Raymund Sänger, and Hans R. Voellmy. *Zeitschrift für angewandte Mathematik und Physik*, v. 3, July 15, 1952, p. 241-258.

Assuming a straight course of the target, the trajectories of beam rider anti-aircraft missiles were computed for different launching intervals. Three different guiding systems are discussed by showing the necessary steering movements.

Miscellaneous Publications

13664 Application of Fuels and Lubricants in Utility Fleet Operations. William A. Howe. American Gas Association, Proceedings, v. 33, 1951, p. 318-344. (TP700 Am35p)

Discussion on above concerning especially low temperature, light load service. Numerous photographs, graphs, and tables show effects of fuels and various oils on engines (including wear and corrosion) and their performance.

13665 Gas for Motor Fuel. R. C. Alden and F. E. Selim. American Gas Association, Proceedings, v. 33, 1951, p. 424-438. (TP700 Am35p)

General discussion covering such topics as motor fuel characteristics, operational information, and (chiefly) economic aspects. Charts, diagrams, and tables.

13666 Use of Chocked Nozzle Technique and Exhaust Jet Diffuser for Extending Operable Range of Jet-Engine Research Facilities. John H. Povolny. National Advisory Committee for Aeronautics, Research Memorandum E52E12, July 22, 1952, 17 pages. (TL570 Un35)

Describes above methods, presents considerations involved in their application, and gives typical results of their use as well as confirmation of the accuracy of data obtained by their utilization. Tables, diagrams, and graphs.

13667 Noise From Intermittent Jet Engines and Steady-Flow Jet Engines With Rough Burning. Leslie W. Lassiter. National Advisory Committee for Aeronautics, Technical Note 2756, Aug. 1952, 21 pages. (TL570 Un3t)

Studies made on sound measurements of pulsejet and subsonic ramjet engines. Diagrams and graphs.

13668 Experimental Studies of Noise From Subsonic Jets in Still Air. Leslier W. Lassiter and Harvey H. Hubbard. National Advisory Committee for Aeronautics, Technical Note 2757, Aug. 1952, 35 pages. (TL570 Un3t)

Parameters such as jet velocity, density, and turbulence level, as well as jet size, on noise generated by subsonic jets were investigated. Noise intensity was found to increase considerably with increases in exit velocity and turbulence level and by a lesser amount with increases in jet size and exit gas density, with the highest levels being generally observed downstream of the orifice and near the jet boundary. The noise generated by a turbojet engine is shown to be closely related to that generated by simple model jets and an empirical relation is given to allow extrapolation of available jet-noise data to other operating conditions.

13669 Gas Turbine Electric Locomotives. R. A. Williamson. *Proceedings of the Railway Fuel and Traveling Engineers' Association*, v. 15, 1951, p. 149-153. (TJ607 R13a)

Brief review of developments of the past year and description of a new model.

Books

13670 Praktische Energiewirtschaftslehre. (Practical Power Engineering.) Ludwig Musil. 279 pages. 1949. Springer-Verlag, Vienna, Austria. (TJ153 M97p)

Discusses aspects common to power engineering in all fields, starting from the power needs of an economic area, and deal ing with the raw power supply, and economical processing of such supply. Treats power engineering in general; economic utilization of water power, windpower, and fuels; and economical production, conduction, and distribution of electric power. 111 illustrations.

See also:
13567 (Packard marine diesel engines)
14059 (heat transfer in rocket-motor nozzles)
14071 (basic problems in central-station nuclear)

22. CERAMICS

13671 Thermal Expansion of Some Simple Gases. M. D. Karkhanavala and F. A. Hummel. *Journal of the American Ceramic Society*, v. 35, Sept. 1, 1952, p. 215-219.

For a better understanding of the contribution of various oxides to thermal expansion of silicate glasses, a number of glasses of widely different compositions were examined. Experimental methods and results are given. 19 ref. Graphs.

13672 Flow Characteristics of Fire-Clay Refractories at High Temperatures. Paul G. Herold and Christen Knudsen. *Journal of the American Ceramic Society*, v. 35, Sept. 1, 1952, p. 220-225.

In the discussion of the above, previous work, description of apparatus, effect of refractories and porosity on shrinkage, comparison of super duty brick, and testing of ladle nozzles are considered. Graphs.

13672a Improved Design of Apparatus for Measuring Thermal Conductivity of Refractories and Insulation at High Temperatures. V. J. Duplin, Jr. and E. S. Fitzsimmons. *Journal of the American Ceramic Society*, v. 35, Sept. 1, 1952, p. 226-229.

Apparatus for measuring thermal conductivity of refractories, insulating firebrick, and insulation at high temperature was improved in design. Accuracy of furnace temperature control was improved and operating procedure simplified.

13673 Reactions During Sintering of a Zirconium Carbide-Niobium Cermet. W. G. Lidman and H. J. Hamjian. *Journal of the American Ceramic Society*, v. 35, Sept. 1952, p. 236-240.

A zirconium carbide-columbium cermet sintered under pressure was investigated. Effect of the variables, sintering temperature, and time at temperature, on the crystallographic structures was examined by back-reflection x-ray diffraction.

13674 Effect of Residual Compressive Stress in a Hotel-China Glaze on Some Physical Durability Properties of the Glaze. W. J. Koch, C. G. Herman, and L. S. O'Bannon. *Journal of the American Ceramic Society*, v. 35, Sept. 1, 1952, p. 240-242.

Shows that resistance of a hotel-china glaze to fracture by impact was improved by increasing the residual compressive stresses in the glaze. Increases in residual compressive stresses were developed, for laboratory convenience, by increasing the

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coefficient of expansion of the body by the incorporation of alumina.

13675 Recent Glaze and Color Developments Resulting From Raw Material Scarcities and Restrictions. John Marquis. *American Ceramic Society Bulletin*, v. 31, May 1952, p. 161-164.

13676 Tunnel Kiln Economics. Dwight B. Hendryx. *American Ceramic Society Bulletin*, v. 31, May 1952, p. 169-171.

Deals with economic considerations involved in adding a tunnel kiln to an old plant or building an entirely new plant. The various factors of investment costs are discussed, as well as reductions in operating cost that can be made. Savings in labor and fuel are considered, with investment necessary to make these savings. The cost of firing both periodic and tunnel kilns with various types of fuel is given.

13677 Thermodynamics in Ceramics. I. Energy and Heat Content. II. Free Energy, Entropy, and Equilibrium. III. Stability of Ceramic Materials. IV. Crystal Chemistry, Physical Processes and Surface Effects. W. D. Kingery and J. F. Wygant. *American Ceramic Society Bulletin*, v. 31, May 1952, p. 165-168; June 1952, p. 213-217; July 1952, p. 251-255; Aug. 1952, p. 294-297.

Includes numerous graphs, tables, and calculations. (To be continued.)

13678 Relation of Bubble Structure to Freeze-Thaw Spalling in Porcelain Enamel Cover Coats. G. B. Hughes, H. D. Bowsher, and J. A. Schiefferle. *American Ceramic Society Bulletin*, v. 31, June 1952, p. 199-203.

The bubble structure of several enamels was microscopically studied after progressive etching with 24% HF. The data showed a definite correlation between spalling and number of bubbles per sq. in. with an apparent diameter of 0.003 in. and larger. The method developed allows evaluation of relative free-thaw spall resistance of enamel cover coats in less than an hour.

13679 Metal-Ceramic Composites. J. H. Westbrook. *American Ceramic Society Bulletin*, v. 31, June 1952, p. 205-208; July 1952, p. 248-250.

Reviews the general field of metal-ceramic materials with respect to their history, applications, forms, properties, manufacture, and design. Underlying problems involved in fabrication and application are analyzed and lack of basic data for many common chemical and physical properties is emphasized. Part II treats design, fundamental problems, basic data required, equipment, and the present status. 107 ref.

13680 Use of Roasted Clay in the Manufacture of Firebrick. H. F. West and J. H. Veale. *American Ceramic Society Bulletin*, v. 31, June 1952, p. 209-212.

A firebrick manufacturer was faced with the problem of how to increase production and maintain quality without putting in additional kilns. Shows how he solved this problem by introducing ⅓ roasted clay (heated to 1500°F.) into his brick mix. This was found to be superior to brick grog, which is commonly used. Also describes a simple laboratory oxidation test for clay which indicates how fast the tunnel kilns can be run.

13681 Minimum Refractory Weights Mean Greater Operating Profit. E. A. Grannen. *American Ceramic Society Bulletin*, v. 31, June 1952, p. 220-221.

Analysis of cost and performance figures compiled since changeover in 1946 from firing saggers to silicon carbide plates shows operating advantages of the silicon carbide type refractories in bisque ware manufacture.

13682 The Effects of Wetting Agents on the Physical Properties of Clay Bodies. R. E. Pyle and P. R. Jones. *American Ceramic Society Bulletin*, v. 31, July 1952, p. 233-236.

Effect of addition of various types of industrial wetting or surface-active agents upon properties of a clay body were studied by comparison of drying and firing shrinkage, dry and fired strength, apparent porosity, and various forming characteristics.

13683 Some Common Sources and Causes of Stones in Glass From Continuous Melting Furnaces. A. K. Lyle. *American Ceramic Society Bulletin*, v. 31, July 1952, p. 240-243.

Refractory stones in glass are shown to originate primarily in the superstructure of furnaces. Factors affecting formation of stones are temperature, chemical activity, time shearing or tension force, and furnace atmosphere. The process by which stones are formed is described in terms of the phase-rule diagram for the system silica-alumina-soda. The same process is shown to account for formation of surface cords on glassware and of nephelite "worms" in dark green and amber glasses.

13684 Wollastonite Bodies as Low-Loss Dielectrics. Nicholas H. Snyder and John H. Koenig. *American Ceramic Society Bulletin*, v. 31, July 1952, p. 246-247.

Shows that compositions primarily of wollastonite, clay, and barium compounds have extremely low electrical-loss factors of the order of 0.4% or better. Flexural strength ranges from 13,000 to 16,000 psi. Commercial application of these bodies is considered.

13685 Cooling in Tunnel Kiln. C. W. Isenhour, Jr. *American Ceramic Society Bulletin*, v. 31, Aug. 1952, p. 274-275.

Discussion deals especially with clays that contain a relatively high amount of free silica. Includes diagrams.

13686 Strength of Glass. Games Slayter. *American Ceramic Society Bulletin*, v. 31, Aug. 1952, p. 276-278.

Discusses fundamental aspects of the above, with emphasis on the great difference between glass in bulk and fiber form. Includes illustrations showing structure of glass flakes at 120,000 magnification.

13687 Properties of Some High Titania Dielectric Ceramics. Ernest G. Graf. *American Ceramic Society Bulletin*, v. 31, Aug. 1952, p. 279-282.

Properties of the more common titanates and steps necessary to fabricate dielectric bodies are briefly discussed. Various methods of altering their dielectric properties by means of additions which affect crystal structure are illustrated for capacitors consisting mainly of barium titanate. Effects of some commonly encountered contaminants are also illustrated.

13688 A Review of Methods for Determining Particle Size Distribution of Ceramic Raw Materials. R. S. Lamar. *American Ceramic Society Bulletin*, v. 31, Aug. 1952, p. 283-288.

Limitations and suitabilities of the various methods, laboratory procedures, inherent inaccuracies, and size ranges are discussed. 48 ref.

13689 Glass—New Developments—New Products. T. J. Thompson. *American Ceramic Society Bulletin*, v. 31, Aug. 1952, p. 289-293.

Reviews briefly some of the more interesting new glass items and new applications of old ones. Illustrated.

13690* The Dilatometer and Its Application in the Ceramics Industry. (German.) A. Rittgen. *Berichte der Deutschen Keramischen Gesellschaft e.V. und des Vereins Deutscher Emailfachleute* e.V., v. 29, May 1952, p. 143-158.

Diagrams and describes various dilatometers. Their application for testing raw materials, unbaked masses, and baked materials is described. Data are extensively charted.

13691* Recent Information in the Field of Surface Protection of Refractory Materials. II. (German.) A. Staerker. *Berichte der Deutschen Keramischen Gesellschaft e.V. und des Vereins Deutscher Emailfachleute e.V.*, v. 29, Apr. 1952, p. 122-123.

Briefly discusses test results on protective coatings for refractory brick against corrosive gases and slags.

13692 Corrosion of Refractory Materials. Part II. Helen Towers. *Blast Furnace and Steel Plant*, v. 40, Sept. 1952, p. 1054-1060. (Translated from *Berichte der Deutschen Keramischen Gesellschaft und des Vereins Deutscher Emailfachleute*, v. 29, 1952.)

Part II concludes a review of literature data on the above. Includes refractories for blast furnaces, open hearth and converter furnaces, and glass tanks. 66 ref.

13693 The Effect of Moisture Content on the Strength of Unfired Ceramic Bodies. D. A. Holdridge. *Transactions of the British Ceramic Society*, v. 51, Aug. 1952, p. 401-408.

Describes a rough test, which was used on a factory, in which a direct load is applied to the base of a saucer resting on its rim, indicating that a pronounced increase in strength occurred on drying at 110°C. Tables.

13694 Adapting Research Tools for Process Controls in the Whitewares Industry. John H. Koenig and Edward J. Smoke. *Ceramic Age*, v. 60, Aug. 1952, p. 17-18, 20.

Discussion of above with special reference to particle size of raw materials and their chemical analysis; crystal analysis and nondestructive testing of the ware.

13695 An Evaluation of Magnetic Ceramics. Thomas A. Dickinson. *Ceramic Age*, v. 60, Aug. 1952, p. 23-24.

13696 Action of Glass Melting Accelerators at High Temperatures. B. M. Pearson. *Ceramic Age*, v. 60, Aug. 1952, p. 34-35. (Translated and condensed from an article by L. J. Buneeva, V. V. Polliak, and J. D. Tykachinskii; *Steklo i Keramika*, Feb. 1949, p. 3.)

Results of experiments on the above at Moscow Glass Institute Laboratories are tabulated and summarized.

13697* Thermal Analysis and Its Application to the Identification of Ceramic Materials. *Ceramics*, v. 4, Aug. 1952, p. 10-14, 16.

Includes apparatus diagrams, quantitative determinations, and double differential thermal analysis, along with a general discussion of the above. 15 ref.

13698* Pugging and Extrusion. F. J. Goodson. *Claycraft*, v. 25, Aug. 1952, p. 586-588.

Investigation was made of an experimental pug mill for ceramic batches on which continuous autographic recordings of thrust, torque, and rate of extrusion can be obtained while the machine is operating.

13699* Zirconium Dioxide—A New Type of "Stone" in Glass. (Russian.) V. V. Lapin. *Doklady Akademii Nauk SSSR*, new ser., v. 84, May 21, 1952, p. 567-569.

A study was made of the above inclusions in technical glass. Results are tabulated and illustrated.

13700* Density Measurement of Concrete Slabs Using Gamma Radiation. E. E. Smith and A. C. Whiffin. *Engineer*, v. 194, Aug. 29, 1952, p. 278-281.

Describes the determination of density at various depths in concrete slabs by measuring absorption of γ-radiation passing through a known thickness of material. An outline is given of physical basis of method, and indications are given of range and limitations of technique. Details are given of the apparatus finally developed. Graphs.

13701* Ineleastic Deformation of Reinforced Concrete in Relation to Ultimate Strength. Henry J. Cowan. *Engineering*, v. 174, Aug. 29, 1952, p. 276-278.

Presents theoretical analysis of the above and shows relationship of behavior to that of steel. Diagrams and graphs. 18 ref.

13702 Experiments With White Enamel Directly to Steel. A. L. Friedberg. *Finish*, v. 9, Sept. 1952, p. 23-26.

Represents a progress report including treatment of steel, and study of effects of pre-enameling treatment on bond and appearance. Photographs and table summarize results.

13703* The Surface Properties of Glass. (Concluded.) B. Simmingskold. *Glass*, v. 29, Aug. 1952, p. 315-316. (Translated from *Glasteknisk Tidskrift*, v. 6, no. 3, 1951, p. 61-66.)

Reviews literature on effect of cooling on alkalinity of the glass surface and effect of dealkalizing on mechanical properties of glass.

13704 Fundamental Investigation of Steel Plant Refractories Problems: V. Arnulf Muan and E. F. Osborn. *Industrial Heating*, v. 19, Aug. 1952, p. 1492, 1494, 1496, 1498.

Deals with the system $2CaO \cdot SiO_2$-$CaO \cdot SiO_2$-$2CaO \cdot Al_2O_3 \cdot SiO_2$-FeO. (To be continued.)

13705* Iron in Glass—Colourless & Coloured Forms. S. N. Prasad. *Journal of Scientific & Industrial Research*, v. 11A, June 1952, p. 245-254.

Reviews results reported in literature on this subject in light of the views of Moore and Prasad. Graphs and tables. 20 ref.

13706 Refractive Uniformity of a Borosilicate Glass After Different Annealing Treatments. Leroy W. Tilton, W. Rosberry, and Florence T. Badger. *Journal of Research of National Bureau of Standards*, v. 49, July 1952, p. 21-32.

In investigating claims that only low holding temperatures are adequate when annealing optical glass for a highly homogeneous product, interferometric tests were made on ten 2-in. cubes of above after an annealing at 515°C. The tests were repeated after the cubes were reannealed, at 490° and 530°C. For each of 3 presentations of the cubes with respect to light paths, contours of differences in refractive index were drawn at intervals of 5×10^{-7}. Contour and other diagrams.

13707* Manufacture and Properties of Paper Made From Ceramic Fibers. Thomas D. Collinan and Robert T. Lucas. *Paper Trade Journal*, v. 135, Aug. 22, 1952, p. 24, 26, 28.

Tabulated information and discussion of above with emphasis on "Fiberfrax".

13708* Ring Formation in Cement Kilns. B. M. Pearson. *Rock Products*, v. 55, Aug. 1952, p. 158-159.

Incomplete combustion is shown to be the primary cause of rings in rotary cement kilns. Secondary factors include chemical composition of raw materials, humidity, fineness of grinding, volatile materials, combustion time, heat value of coal, and excess air.

13709 An Investigation of Antimony Oxide as an Opacifier for Porcelain Enamels and Glass. A. E. Pavlish and L. S. O'Bannon. *Science*, v. 116, Aug. 22, 1952, p. 196-200.

Presents experimental results obtained during investigation of effect of various additions on opacity of a high-Sb enamel-like glass. Graphs, tables, and ternary diagrams.

13710* Behavior of Ceramic Casting Slips. (German.) M. Linseis. *Sprechsaal für Keramik; Glas; Email*, v. 85, July 20, 1952, p. 321-326.

Discusses distinction between a Newtonian liquid and a ceramic suspension, also theories on viscosity, thixotropy, dilatency, and yield value of ceramic suspensions. Flow-rate experiments are described. Data are charted and tabulated. 18 ref.

13711* Electrical Porcelain. (German.) Friedrich Reinhart. *Sprechsaal für Keramik; Glas; Email*, v. 85, Aug. 5, 1952, p. 347-349.

Reviews new compositions and forming processes revealed by American, German, French, British, and Swiss patents.

13712* Graphical and Statistical Analysis of Glass. (French.) I. Havenaar, J. M. Stevels, and H. I. Waterman. *Verres et Réfractaires*, v. 6, May-June, 1952, p. 137-143.

Proposes method of calculating values of physical constants from glass composition. Describes a process for production of sodium silicate glass of high homogeneity on the basis of the above. 13 ref.

13713* Stresses and Transformation Range of Glass. (French.) Francis Naudin. *Verres et Réfractaires*, v. 6, May-June 1952, p. 144-153.

Use of measurement of indexes of refraction and of birefringence for establishing the structural state of glass is discussed. Experimental details are indicated; results are interpreted. 17 ref.

Miscellaneous Publications

13714 Fifth Quarterly Progress Report: Contract for Services, Facilities and Materials Required to Investigate and Study Magnetic Ferrites. E. Albers-Schoenberg and Harold A. Goldsmith. General Ceramics and Steatite Corp., Report to U. S. Army Signal Corps, Apr. 1-June 30, 1950, 31 pages. (Photostat available from Office of Technical Services, U. S. Dept. of Commerce, Washington.) (T21 Un34)

Presents experimental data for above report period in relation to developing ferromagnetic ferrites of different permeabilities, and low magnetic losses, and studying production conditions. Graphs and tables.

22. *Ceramics*

13715 The Application of Electro-Carbon Products as Construction Elements in Apparatus and Machine Building. W. Stockmeyer. 4th International Mechanical Engineering Congress, June 1952, 7 pages.

Discussion. List of mechanical and physical properties. Illustrated applications.

13716 Study of Metal-Ceramic Interactions at Elevated Temperatures. F. H. Norton and W. D. Kingery. Atomic Energy Commission, NYO-3139, Apr. 1, 1952, 65 pages. (UF767 U3ny)

Reviews literature pertaining to carbide, nitride, and sulfide reactions with metals. Samples of nitrides and carbides were prepared for use in reaction and surface-tension studies. Surface tension and wettability data for Fe, Ni, and Si on ceramic oxides are reviewed and results summarized. Additional improvements and tests of a microscopic furnace for sintering studies were completed and spherical particles of aluminum and zirconia prepared.

Books

13717 Progress in the Chemistry of Organic Natural Products. Vols. VI and VII. L. Zechmeister, editor. 392 and 330 pages. 1950. Springer-Verlag, Vienna, Austria. (QD245 F77c)

Consists of a series of review articles as follows: Vol. VI—"Some Biochemical and Nutritional Aspects in Fat Chemistry", H. J. Densel, Jr. and S. M. Greenberg; "Animal Odors and Perfumes" (French), E. Lederer; "Occurrence and Biochemical Behavior of Quinone" (German), O. Hoffman-Ostenhof; "Cactus Alkaloids and Some Related Compounds", L. Reti; "Plant Proteins", J. Bonner; and "Recent Porgress in the Fluorescence Spectrochemistry of Biological Products" (French), Ch. Dhéré. Vol. VII—"Concerning the Constitution of Triterpene" (In German), O. Jeger; "Constitution, Configuration, and Synthesis of Digitaloid Aglycones and Glycosides" (In German), H. Heusser; "Thyroxine and Related Compounds", C. Niemann; "Penicillin and Its Place in Science", A. H. Cook; "Sennosides A and B, the Active Principles of Senna", A. Stoll and B. Becker; and "Some Recent Developments in the Chemistry of Antibodies", J. W. Williams.

See also:
13044 (graphite crucibles)
13630 (production of steam for the ceramic industry)
13634 (heat flow through ceramic walls)
13907 (sizes for glass fabrics for plastic reinforcement)
14231 (British glass industry directory)

23. LUBRICATION AND FRICTION

13718 Load Carrying Capacity of Bearings. C. J. Vogt. *Automotive Industries*, v. 107, Aug. 15, 1952, p. 42-45, 76, 78.

An analysis of the influence of length-diameter ratio on the load-carrying capacity of journal bearings. Considers rigid materials, influence of elasticity, effect of surface finish, and decrease in load-carrying capacity when a circumferential groove is cut in the bearing. Diagrams, graphs, and calculations.

13719* Effect of Pressure on the Viscosity of Lubricating Oils on the Basis of Experimental Measurements. (German.) Werner Ruppert. *Brennstoff-Chemie*, v. 33, Aug. 20, 1952, p. 273-278.

General formulation of a larger number of natural laws is applied to Kiesskalt's law for the pressure-viscosity relationship, and advantages of its use in computing viscosities of lubricants is demonstrated. Deviations are explained. Data are tabulated and graphed. 17 ref.

13720* Which Lube Oil? *Diesel Power and Diesel Transportation*, v. 20, Aug. 1952, p. 44-51.

Outlines current status of various oils, particularly those of the additive type. Includes illustrations showing appearance of pistons after testing; photomicrographs of bearings showing difference between fatigue and corrosion failure; also graphs, tables, and other illustrations.

13721 New Bearing Made of Any Material, Lubricated With Any Fluid. R. M. Higgins. *Iron Age*, v. 170, Sept. 11, 1952, p. 158-160.

Description of a fluid-piston type bearing developed by Allis-Chalmers Mfg. Co. Diagrams.

13722 Metal Transfer During Static Loading and Impacting. E. Rabinowicz. *Proceedings of the Physical Society*, v. 65, sec. B, Aug. 1, 1952, p. 630-640.

Experiments on pressing of a hemispherical slider into a flat metal surface show that metal fragments are transferred from one surface to another, and this shows that strong junctions are formed between metal surfaces in contact. Experiments were made using various similar and dissimilar metal pairs. Lubricants were found to reduce size, not number of junctions. Diagrams, autoradiographs, micrographs. 10 ref.

13723 On the Energy Equation for Fluid-Film Lubrication. A. Charnes, F. Osterle, and E. Saibel. *Proceedings of the Royal Society*, ser. A, v. 214, Aug. 7, 1952, p. 133-136.

Above is developed in such a way as to resolve the discrepancy that now exists in the literature. A qualitative estimate of error introduced by use of the incorrect equation is given.

Miscellaneous Publications

13724 Friction Materials. K. G. Thafvelin. 4th International Mechanical Engineering Congress, June 1952, 10 pages.

Briefly discusses manufacture and treatment of above, composed of metal powder mixed with powdered nonmetallics; desired properties; choice of materials; and services. Photographs and graph.

13725 Self-Lubricating Bearings—Their Properties and Applications. K. G. Thafvelin. 4th International Mechanical Engineering Congress, June 1952, 20 pages.

Covers: theory of bearings; experimental data on bronze bearings; friction data; permissible load; heat expansion; choice of material, oil, and shafts; assembly; and suitable applications. Photographs, graphs, and equipment and other diagrams.

See also:
13664 (effects of lubricants on engines)

24. DESIGN

13726* Variation in Strength of Nominally Identical Tail Planes. K. D. Raithby. *Aircraft Engineering*, v. 24, Aug. 1952, p. 223-225.

Results of destruction tests on several batches of tail planes of different types are recorded and a brief analysis is given. Test results give an indication of the variation in strength among certain types of nominally identical light-alloy structures. Tables, diagrams, and illustrations.

13727 Don't Overlook Operator Safety in Press-Tool Design. L. A. Faulkner. *American Machinist*, v. 96, Sept. 1, 1952, p. 121-134.

Presents safety practices by means of good design and barriers in primary and secondary operations. Extensive diagrams and photographs.

13728* The Growth and Present State of Three-Dimensional Photoelasticity. M. M. Frocht. *Applied Mechanics Reviews*, v. 5, Aug. 1952, p. 337-340.

Briefly reviews the above from the work of Oppel to the present time. Optical method of stress analysis may be viewed as a practical instrument capable of the exploration of the complete state of stress in general space problems. 43 ref.

13729* A Lock Nut and Nut Fatigue Testing Machine. *Engineer*, v. 194, Aug. 29, 1952, p. 284-285.

Points out that above machine was developed for testing bolt and nut assemblies under vibration; and working at predetermined frequency, amplitude, and intensity of vibration, is designed to give in minutes and seconds ratio of efficiency to be expected from different bolts and nuts in any application. Diagrams.

13730* Multiply-Loaded and Continuously-Loaded Struts. W. J. Duncan. *Engineering*, v. 174, Aug. 8, 1952, p. 180-182; Aug. 15, 1952, p. 202-203.

Describes some approximate methods for calculating critical loadings of slender struts when the loads are applied at more than one point or continuously. For comparison, the "exact" method for calculating the critical loadings is also described. Second part gives details of some typical applications.

13731* The Design of Flexible Disk Misalignment Couplings. P. H. W. Wolff. *Institution of Mechanical Engineers, Proceedings* (Applied Mechanics Div.), v. 165, W.E.P. 67, 1951, p. 165-174; disc., p. 174-175.

Presents results of calculations to determine the increase in operating range of a disk coupling with skew misalignment which would be obtained by tapering the disks. Results concerning the stresses due to "umbrella" deflections, the vibration frequencies of tapered disks, and the torque buckling of disks of constant thickness are also presented. All results were obtained by integration of the general differential equation for disk bending. Photographs and graphs.

13732* Effect of Shear in Transverse Impact Beams. D. G. Christopherson. *Institution of Mechanical Engineers, Proceedings* (Applied Mechanics Div.), v. 165, W.E.P. 67, 1951, p. 176-184; disc., p. 184-188.

Considers the above theoretically. Refers to 2 examples which represent wide range of impacts: the beam struck transversely by a uniform square-ended rod traveling perpendicularly to it, and the same problem for the striker having a spherical end. Tables, graphs, and diagrams.

13733 Design Considerations for Heat and Corrosion-Resistant Castings. E. A. Schoefer. *Machine Design*, v. 24, Sept. 1952, p. 148-154.

Discussion of above differentiating between low, high, and superalloys. Article includes photographs and a very comprehensive table of room-temperature mechanical properties. Main groups are low-alloy and stainless steels, and special alloys (Co- and Ni-base).

13734 Side-Worm Gearing. Azor D. Robbins. *Machine Design*, v. 24, Sept. 1952, p. 163-167.

An appraisal of characteristics and design procedure for the above. Schematic diagrams.

13735 Quality Control Methods: Their Use in Design. Part 3. How and Where to Control. Dorian Shainin. *Machine Design*, v. 24, Sept. 1952, p. 168-174.

Explains the use of control charts and Reset-Run cards. Typical charts illustrated.

13736 Water Hammer in Hydraulic Systems. Harold K. Palmer. *Machine Design*, v. 24, Sept. 1952, p. 175-178.

Discussion on determining pressure-surge effects resulting from rapid valve closure. Relationship of deceleration time to fluid velocity and pressure is shown nomographically.

13737 Simplifying Servomechanism Design. John M. Embree and Stephen P. Higgins, Jr. *Machine Design*, v. 24, Sept. 1952, p. 183-185, 260, 262, 264, 266.

Presents coordinated analysis of design components achieved by using systematic-approach block diagrams.

13738* Pneumatic Systems in Machine Design and Control. H. C. Town. *Machinery* (London), v. 81, Aug. 7, 1952, p. 231-239.

A variety of the above systems are described and diagrammed, and their applications discussed.

13739* Selection of Seals for Various Duties. E. P. Stahl. *Machinery* (London), v. 81, Aug. 28, 1952, p. 367-373.

Discusses the more common types of seals and closures available for protecting bearings. Diagrams.

13740* The Influence of Aeronautical Research and Development on Engineering Design. Frank H. Slade. *Machinery Lloyd* (Overseas Ed.), v. 24, Aug. 30, 1952, p. 69, 71, 73, 75-81.

Traces the many ways in which the aeronautical industry has helped raise level of associated engineering industries. Starting with axial flow fans and compressors the trend is traced through use of aircraft materials and control methods to wider applications. Diagrams.

13741 Gasket Materials—Their Properties and Uses. Sidney G. Kelley, Jr. *Materials & Methods*, v. 36, Aug. 1952, p. 108-112.

Surveys the above. Deals with various types of rubber, cork compositions, plant fibers, asbestos fibers, metals, plastics, leather, and felt. Also discusses joint design.

13742* Plane Elastic-Plastic Deformation of a Cylinder Loaded by a Balanced System of Two Concentrated Forces. (Russian.) K. N. Shevchenko. *Prikladnaia Matematika i Mekhanika*, v. 16, Jan.-Feb. 1952, p. 35-44.

13743* The Bending of Round Plates Beyond the Limit of Elasticity. (Russian.) A. S. Grigorév. *Prikladnaia Matematika i Mekhanika*, v. 16, Jan.-Feb. 1952, p. 111-115.

Mathematical analysis and graphical interpretation.

13744 High Speed Photography in Design. C. David Miller and Kenneth Shaftan. *Product Engineering*, v. 23, Sept. 1952, p. 167-182.

As applied to the above, characteristics of major types of high-speed cameras and their basic operation, together with the typical fields of application are discussed. Also considers such phases as cost of equipment; types of photographic record; choice of exposure duration; and establishment of time scale. Material is well illustrated with graphs, diagrams, etc., plus a chart of high-speed camera systems.

13745* Economy of Steel. J. F. Baker and B. G. Neal. *Research*, v. 5, Sept. 1952, p. 412-418.

Shows that behavior of structures in the plastic range (i.e., preceding collapse) can be used in developing a direct method of design based on calculation of collapse load. Where strength of structure is the sole design criterion economy can be achieved by application of the plastic methods. Diagrams and graphs.

13746* Nomogram for Design of Cylindrical Rubber Compression Springs as Vibration Dampers for Engines. (French.) J. A. J. Bronkhorst. *Revue Générale du Caoutchouc*, v. 29, Aug. 1952, p. 584-587.

Includes details of calculations and application to a typical example.

13747 A Characteristic Type of Instability in the Large Deflexions of Elastic Plates. I. Curved Rectangular Plates Bent About One Axis. II. Flat Square Plates Bent Abount all Edges. D. S. Ashwell. *Proceedings of the Royal Society*, ser. A, v. 214, Aug. 7, 1952, p. 98-118.

Mathematical analysis and graphical interpretation. 16 ref.

13748* The Load-Carrying Capacity of Thin-Walled Sheet-Metal Girders. (German.) Alfred Dietzmann. *Technik*, v. 7, Feb. 1952, p. 55-58.

Discusses methods of calculating the strength of transversely stressed I-beams and explains conditions under which the beam ceases to act as a homogeneous shear field. Diagrams and tables.

Miscellaneous Publications

13749 Bending of a Uniformly Loaded Rectangular Plate With Two Adjacent Edges Clamped and the Others Either Simply Supported or Free. M. K. Huang and H. D. Conway. American Society of Mechanical Engineers, Paper 52—APM—14, 1952, 10 pages. (TJ1 Am35p)

Analysis of above in which distribution of deflection and bending moment are obtained by a method of superposition. Numerical values are given for square plates and compared with those obtained by another method. Diagrams and equations.

Books

13750 Structural Theory and Design. Vol. II. J. McHardy Young. 310 pages. 1951. Crosby Lockwood & Son, Ltd., 39 Thurloe Street, S. W. 7, London. $4.00.

Vol. II deals with advanced theory and design suitable for the specializing student and for the practicing structural engineer. Covers various structures; foundations; earth pressures, etc.; and structural connections including riveted, bolted, and

24. *Design*

welded, for steelwork. Photographs, diagrams, tables, and chapter bibliographies and exercises.

See also:
13294 (design of ship structures)
13317 (design of pieces having notches or similar elements)
13643 (furnace design and construction)
13715 (electro-carbon as construction element)
13950 (plastics in mechanical engineering)
13951 (nylon as structural element)
14099 (magnetic and electric clutches)
14116 (design of supersonic aircraft wings)

25. CHEMICAL TECHNOLOGY

13751* Sea Water as a Source of Fresh Water. Everett D. Howe. *Journal, American Water Works Association*, v. 44, Aug. 1952, p. 690-697; disc., p. 697-700.

The author has proposed in a previous paper that attention be given to the possible combination of a sea-water refining plant with a power-generating plant. The present paper develops this general idea from the technical as well as cost viewpoint, and is based on a research program now in progress at the University of California. Diagrams. 22 ref.

13752 Glycerine. Milton Lesser. *American Ink Maker*, v. 30, Aug. 1952, p. 34-37, 67.

A report on its use in printing inks, specialties, and resins. 28 ref.

13753 Activity of Silica-Alumina Cracking Catalysts; A Simple pH Test. C. J. Plank. *Analytical Chemistry*, v. 24, Aug. 1952, p. 1304-1306.

Describes simple method of estimating the above which involves adsorption of ammonium ions from a standard ammonium acetate solution. Resultant pH of the solution is correlated with the cracking activity. The limitations as well as the advantages are noted. Graphs. 11 ref.

13754 Fighting Marine Destruction. Ray E. Heiks. *Battelle Technical Review*, v. 1, Aug. 1952, p. 89-90.

Discusses the seriousness of the problem of marine destruction and latest method employed to combat it. Considers use of paint coatings for corrosion prevention also use of corrosion-resistant alloys.

13755* The Problem of High-Pressure Production of Useful Products from Coal. (German.) Erich Schön. *Brennstoff-Chemie*, v. 33, July 23, 1952, p. 227-231.

Practical suggestions on improving the economy, yield, and quality of city gas and other products of coal distillation are presented. Charts, diagrams, and tables.

13756* The Effect of Temperature and Duration of Stay of the Gas in the Gas-Collection Chamber of Coke-Oven Chambers on the Yield of Byproducts. (German.) Franz Trefny. *Brennstoff-Chemie*, v. 33, Aug. 20, 1952, p. 257-260.

Describes methods of computing optimum values for above factors.

13757* The Production of Elemental Sulphur From Jumping Pound Natural Gas. L. T. Munn. *Canadian Mining and Metallurgical Bulletin*, v. 45, Aug. 1952, p. 487-488.

Describes production of S from H_2S contained in natural gas at a Candian plant. Diagrams.

13758 Sorbitol and Derivatives. *Chemical Engineering*, v. 59, Aug. 1952, p. 208-211.

Use of a diagram and photographs to illustrate manufacture of above.

13759 Switch in Vinyl-Chloride Making. *Chemical Engineering*, v. 59, Aug. 1952, p. 240.

With a high-yield process, Dutch vinyl chloride plant utilizes ready source of dichloroethane as starting material.

13760 Organic Synthetic Detergents. C. P. Neidig and A. B. Hersberger. *Chemical and Engineering News*, v. 30, Sept. 1, 1952, p. 3610-3615.

An economic survey. Tables and graphs.

13761 Hydrocarbon Reforming Processes. H. E. Bramston-Cook. *Chemical Engineering Progress* (Engineering Section), v. 48, Aug. 1952, p. 381-384.

Discusses relative merits and future prospects for production of various aromatic compounds from petroleum.

13762 Pipe-Line Design for Non-Newtonian Solutions and Suspensions. G. E. Alves, D. F. Boucher, and R. L. Pigford. *Chemical Engineering Progress* (Engineering Section), v. 48, Aug. 1952, p. 385-393.

Information is presented on the various classifications of non-Newtonian fluids and on methods of obtaining their shear diagrams using rotational or pipe-line-type viscometers. Methods are presented whereby data given by either type of viscometer can be converted to a form directly useful in design of plant-scale pipe lines. Corroborative experimental data are presented on 4 representative materials. Diagrams and graphs. 28 ref.

13763 A Liquid-Dowtherm Heating and Cooling Unit. T. G. Stack and J. E. Friden. *Chemical Engineering Progress* (Engineering Section), v. 48, Aug. 1952, p. 409-412; disc., p. 412.

Installation to maintain reaction temperatures in pilot-scale equipment for operation over the range 125-650°F. Diagrams and illustrations.

13764* Industrial Electrodialysis Cell. *Chemical & Process Engineering*, v. 33, Aug. 1952, p. 428-430.

Describes improved electrodialysis cell for industrial applications developed by Dutch Central National Council for Applied Scientific Research. This cell operates on the same principle as the conventional flat cell and has been built and operated on a pilot-plant scale. Gives details of basic design, materials of construction, inherent advantages, practical difficulties, and potential applications.

13765 Oxygen Upstages Steam. *Chemical Week*, v. 71, Aug. 30, 1952, p. 28-31.

Describes new method of synthesizing NH_3 which depends on intermediate formation of synthesis gas and reaction with steam to get more H_2. New method makes use of tonnage O_2 rather than steam for the initial oxidation of natural gas.

13766* Heat Transfer Between Fluidized Beds and Reactor Walls. (German.) H. Trawinski. *Chemie-Ingenieur-Technik*, v. 24, Aug. 1952, p. 444-446.

Gives an interpretation on the mechanism of heat transmission. Heat transfer through the entire bed and the share of the effective heat conductivity inside the bed are discussed. Factors influencing heat transfer are expressed by an empirical equation. The influence exercised by the homogeneity of fluidization is discussed. 13 ref.

13767* Paraffin Oxidation in the Synthesis of Fatty Acids. H. Prückner. *Chemische Technik*, v. 4, May 1952, p. 193-199.

Discusses the chemistry of above oxidation, catalysts, raw materials, procedure, yield, and uses of synthetic fatty acids especially in the industrial production of cleaning agents. Photographs. 47 ref.

13768 Acetylene in Chemical Industry. Norman Booth. *Chemistry & Industry*, Aug. 23, 1952, p. 812-819.

Presents the possibility of using acetylene as a raw material in the heavy organic chemical industry and considers special technical and economic problems in using acetylene as a raw material. Refers briefly to some of its more important industrial reactions. Equations and tables.

13769 Uptake of Radioactive Cobalt and Vitamin B_{12} By Some Marine Algae. L. E. Ericson. *Chemistry & Industry*, Aug. 23, 1952, p. 829-830.

Investigation was carried out in order to ascertain whether vitamin B_{12} can be concentrated by an algae growing in seawater containing this vitamin. Different species of seaweed were kept in glass tanks with seawater containing a certain amount of radioactive vitamin B_{12} and the radioactivity of the seawater and seaweed was measured at specific intervals. Concentration-ratio activity in seaweed/activity in seawater was calculated. Uptake of radioactive Co^{60} by the same species of seaweed was also investigated.

13770 Industrial Utilization of Agricultural Wastes. F. N. Woodward. *Chemistry & Industry*, Aug. 30, 1952, p. 844-848.

Presents comprehensive economic analysis of the above, on a worldwide basis, but showing relationship of American work to British and British Commonwealth nations. Productive data for various countries are tabulated.

13771* Tar and Emulsion Troubles. A. R. Myhill. *Coke and Gas*, v. 14, Aug. 1952, p. 289-292. 296.

Formation of tar emulsions in carburetted water-gas practice and methods of dealing with this trouble are considered.

13772* The Initial Stages of the Interaction of Carbon Monoxide and Hydrogen With Cobalt Catalysts at the Temperature of Synthesis of Gasoline. (Russian.) I. A. Zardenman and K. G. Khomiakov. *Doklady Akademii Nauk SSSR*, new ser., v. 84, June 1, 1952, p. 705-707.

Laboratory experiments were made on the above. Data are tabulated and charted.

13773* Theory of the Intensification of the Production of Silicate-System Materials by Use of Added Crystalline Hydrates. (Russian.) P. P. Budnikov, M. A. Matveev, and S. I. Iurchik. *Doklady Akademii Nauk SSSR*, new ser., v. 84, June 11, 1952, p. 1021-1024.

Includes tabular data.

13774 Coal Chemicals. *Fortune*, v. 65, Sept. 1952, p. 122-125, 143-144, 146, 150, 153-154.

Describes new process of coal hydrogenation developed by Carbide and Carbon Chemicals Co. Photographs and process diagrams.

13775* Catalytic Oxidation of Organic Sulphur Compounds in Coal Gas. R. H. Griffith. *Gas Journal*, v. 271, Aug. 27, 1952, p. 475-477, 481.

Discussion of the above includes nickel sulfide catalyst, catalytic plant, working conditions and performance, control of plant, catalyst regenerator, and design of future installation. Diagrams and photographs. 13 ref.

13776 Advances in Heating Mantle Technique. H. Reik. *Industrial Chemist and Chemical Manufacturer*, v. 28, Aug. 1952, p. 357-362.

Describes the new plant heating mantles for use in dangerous areas, discusses their applications, and gives tables and graphs enabling the plant chemist to determine heating-up times and distillation rates.

13777* Classification of Bitumens in Asphalt Technology by Certain Rheological Properties. Part V. Experimental and Graphical Studies Involving Changes in Penetration and Ductility With Temperature. S. L. Neppe. *Journal of the Institute of Petroleum*, v. 38, July 1952, p. 532-557.

Extensive diagrams and tables.

13778* Colorimetric Estimation of Germanium. Part II. Estimation of Germanium in Minerals. C. K. N. Nair and J. Gupta. *Journal of Scientific & Industrial Research*, v. 11B, July 1952, p. 274-276.

Describes procedure and results of investigation of the above. Tables.

13779* Recent Developments in Crystallisation. A. W. Bamforth. *Manufacturing Chemist and Manufacturing Perfumer*, v. 23, Aug. 1952, p. 323-325, 329.

Discusses new studies on crystal growth, the application of crystallization to ammonium sulfate, sugars and high polymers, and developments in production processes. Photographs. 18 ref.

13780* Petrochem Report: Jefferson Chemical Co., Port Neches, Tex. F. Lawrence Resen. *Oil and Gas Journal*, v. 51, Aug. 25, 1952, p. 102-103, 138-141.

Discussion of the ethanolamines operation at the above plant involving ethylene unit, chlorohydrination, and ethylene oxide. Outline of future plans.

13781* The Preparation of Chloride Dioxide. Ferri Casciani. *Paper Trade Journal*, v. 135, Sept. 5, 1952, p. 22, 24, 26, 28, 30, 32.

Reviews various methods for the preparation of the above which is becoming an important "tool" in the paper industry. 99 ref.

13782 Desulfurization and Dehydration of Natural Gas. Leroy Culbertson and J. S. Connors. *Petroleum Engineer*, v. 24, Sept. 1952, p. D10, D12, D14, D16, D18, D20.

Above is covered along with the 2 main commercial processes of dehydration for prevention of hydrate formation. Photographs and diagrams.

13783 Selective Adsorption of Hydrocarbons. Part I. G. Spengler and K. Krenkler. *Petroleum Refiner*, v. 31, July 1952, p. 111-114. (Translated from *Erdöl und Kohle*, III, Mar. 1950.)

Laboratory data on the adsorption of a large group of hydrocarbons on numerous absorbents. Graphs. 24 ref. (To be continued.)

13784 The Effect of the Temperature of Preparation on the Mechanical Properties and Structure of Gelatin Films. E. Bradbury and C. Martin. *Proceedings of the Royal Society*, ser. A, v. 214, Aug. 21, 1952, p. 183-192.

Tables and graphs. 11 ref.

13785* An Automatic Chemical Plant. Eugene Ayres. *Scientific American*, v. 187, Sept. 1952, p. 82-88, 90, 92-96.

Illustrated description of a typical refinery as an example of application of machine control to a continuous process.

13786* Dyeing Paper White. M. C. Hutchins, E. I. Stearns, and F. O. Sundstrom. *Tappi*, v. 35, Aug. 1952, p. 342-350.

Part I discusses methods by which whiteness of paper can be improved, including chemical bleaching of pulp, addition of a white pigment, or of a blue dye or a fluorescent dye. Comparison of different methods, and theoretical evaluation of whiteness are considered. Part II is concerned with various methods for the addition of fluorescent dyes. Graphs and diagrams. 12 ref.

13787* Straw Pulp-Wood Pulp Blends for Various Types of Papers. S. I. Arnovsky, A. J. Ernst, R. J. Seidl, and R. M. Kingsbury. *Tappi*, v. 35, Aug. 1952, p. 351-356.

Wheat straw was pulped by the mechanochemical process, bleached, and blended with wood pulps to produce magazine, book, newsprint, bond, bag, waxing, and greaseproof papers on an experimental fourdrinier paper machine. Control runs were made using wood pulps. Tables and graphs.

13788* A New Method for the Addition of Neoprene Latex to Paper Pulp. J. R. Galloway, R. H. Walsh, J. Burt, J. S. Hickman, and R. E. Shrader. *Tappi*, v. 35, Aug. 1952, p. 357-360.

An investigation of some conditions found in normal papermaking operations affecting addition of and properties derived from neoprene latex. Procedure and results are discussed, and recommendations given.

13789* Some Observations on Sulphate Turpentine Recovery. M. R. Dusenbury and John E. Reese. *Tappi*, v. 35, Aug. 1952, p. 365-367.

13790* Dye Absorption on Wood Pulp. I. Adsorption of Direct Dye on Unbeaten Sulphite Pulp. J. W. Beamesderfer, E. F. Thode, A. J. Chase, and R. E. Hubbard, Jr. **II. Relation of Dye Adsorption to Physical Properties of Beaten Sulphite Pulp.** E. F. Thode, J. W. Beamesderfer, and A. J. Chase. *Tappi*, v. 35, Aug. 1952, p. 374-384.

Deals with application of a technique of adsorption of direct dye from dilute solution to evaluation of properties of unbeaten and beaten pulp fibers. Correlation of adsorption of dye with heating time and physical properties are reported. Graphs. 27 ref.

13791* Mercerization of Yarn—Experimental Apparatus and Techniques. Charles F. Goldthwait, Alton L. Murphy, Idas W. Lohmann, and Herbert O. Smith. *Textile Research Journal*, v. 22, Aug. 1952, p. 540-548.

Apparatus is described and general methods are indicated for study of mercerization of cotton yarn in skeins and for experimental mercerization of lots weighing about ¾ lb. Special techniques, including use of a strain gage, are given for measuring tension developed in yarn during mercerizing. Photographs.

25. *Chemical Technology*

13792* Action of Cyanuric Chloride on Cotton Cellulose. Jane Warren, J. David Reid, and Carl Hamalainen. *Textile Research Journal*, v. 22, Sept. 1952, p. 584-590.

Above was examined to determine effect of reaction conditions on degree of substitution and on retention of chlorine for further modification. Tables. 28 ref.

13793* The Treatment of Wool With Sodium Chlorite. Christopher Farland and Kenneth G. Johnson. *Textile Research Journal*, v. 22, Sept. 1952, p. 591-598.

Presents results of tests to determine if sodium chlorite is an effective antifelting agent. Results are tabulated. 25 ref .

13794* Effects of Unfiltered Carbon Arc Light in Accelerated Weathering of Cotton and Other Textiles. J. D. Deans, C. M. Fleming, and R. T. O'Connor. *Textile Research Journal*, v. 22, Sept. 1952, p. 609-616.

Degradative effects produced in fibers by unfiltered light from a "Sunshine" type carbon arc lamp were compared with those which occurred in identical materials during natural weather exposure tests, in which sunlight is believed to be the chief degrading factor. These tests were designed to afford needed information about the action of shortwave radiation on textiles, and to evaluate practical utility of such radiation in accelerated weathering techniques. Tables and graphs.

Miscellaneous Publications

13795 Oil Gas Production on the World's First Reverse Flow Regenerative Machine—Poughkeepsie, New York. R. J. Horn. American Gas Association, Proceedings, v. 33, 1951, p. 527-542. (TP700 Am35p)

Describes machine and gives plant operating data, including the cycle of operation, results, and analyses of oil, gas, and tar. Numerous tables, diagrams, and charts.

13796 Ethyl Alcohol (Industrial Alcohol) U. S. Tariff Commission, Industrial Materials Series, Report M-I, Sept. 1951, 50 pages. (TP593 Un3e)

A summary of information on uses, production, trade, and supply.

Books

13797 Tanning Processes. August C. Orthmann. 414 pages. 1945. Hide and Leather Publishing Co. (TS965 Or8t)

Gives details of modern procedures as applied to the above. Suitable for both the scientific and the "practical" man, with emphasis on the needs of the latter.

13798 Phosphoric Acid, Phosphates and Phosphatic Fertilizers. Ed. 2. Wm. H. Waggaman. 683 pages. 1952. Reinhold Publishing Corp., New York. (TP245.P5 W12p2)

Deals with mining and recovery of phosphate rock, various processes employed in producing phosphorus, phosphoric acid, and phosphate compounds, and new uses for them. Especially noteworthy is discussion of economic aspects of manufacturing methods from the standpoint of both the manufacturer and the consumer. Complete lists of U. S. patents pertaining to manufacture and use of phosphorus compounds appear in the appendix. Chapter bibliographies.

See also:

13463 (birefringence and refractive index of synthetic fibers)
13584 (clad steels in chemical engineering)
13627 (chemistry of fuels)
13631 (fluidized solid drying of coals)
13707 (paper made from ceramic fibers)
13741 (gasket materials—properties and uses)
13903 (technology of glycols)
13939 (moisture and fungus vs. plastics)
14005 (fungi which decompose jute)
14140 (moisture and mildew vs. electronic equipment)
14142a (MnO_2 for dry-battery use)
14209 (manufacture of stencils and duplicating inks)
14218 (forecasting in the chemical industry)
14219 (Netherlands chemical industry)
14256 (petroleum dictionary)

26. CHEMISTRY—GENERAL, INORGANIC, AND PHYSICAL

13799 Pyrolysis of Fluorocarbons. Robert K. Steuenberg and George H. Cady. *Journal of the American Chemical Society*, v. 74, Aug. 20, 1952, p. 4165-4168.

Systematic study of the above beginning with the simplest of these substances. Tables. 11 ref.

13800 Kinetics of Chemisorption. H. Austin Taylor and Nathaniel Thon. *Journal of American Chemical Society*, v. 74, Aug. 20, 1952, p. 4169-4173.

Presents experimental data on the Elovich equation; implies that the prime function of CO is the production of surface sites which, over the course of the slow adsorption, decay at a bimolecular rate. 30 ref.

13801 Thermochemistry of the Rare Earths. I. Cerium and Neodymium. F. H. Spedding and Carl F. Miller. *Journal of American Chemical Society*, v. 74, Aug. 20, 1952, p. 4195-4198.

Describes experimental data from colorimetric systems and thermodynamic properties derived therefrom. Also, heats of solution and dilution of oxalic acid hydrate, as well as a recalculation of its heat of formation, are reported. 21 ref.

13802 Heat Capacity of Methane Adsorbed on Titanium Dioxide Between 55 and 90°K. E. L. Pace, D. J. Sasmor, and E. L. Heric. *Journal of the American Chemical Society*, v. 74, Sept. 5, 1952, p. 4413-4415.

Describes briefly some features in construction and operation of a low-temperature adiabatic calorimeter for study of gas-solid systems. Heat capacity of methane adsorbed on titanium dioxide (rutile) was determined between 55 and 90°K. at 4 coverages ranging from 0.2 to 1.0 monolayer. 12 ref.

13803 Some New Uranium Complexes. John T. Barr and Charles A. Horton. *Journal of the American Chemical Society*, v. 74, Sept. 5, 1952, p. 4430-4435.

A study was made of action of organic bases, acidic complexing agents, and amino acids upon organic solutions of U compounds. Type of product obtained was a function of both oxidation state of U and of the type of complexing agent. Graphs. 14 ref.

13804 Activity Coefficients of Uranyl Fluoride From Freezing Point Depressions: Undissociated Species and Dimerization. James S. Johnson and Kurt A. Kraus. *Journal of the American Chemical Society*, v. 74, Sept. 5, 1952, p. 4436-4439.

Freezing point depressions of aqueous uranyl fluoride solutions were obtained in region 0.1-5 molal UO_2F_2 by a warming curve method. A thermistor was used as temperature sensitive element in an automatically-recording system. Activity coefficients were calculated from these data. Tables and graphs. 18 ref.

13805 The Heat Capacity of Anhydrous $NiCl_2$ From 15 to 300°K. The Antiferromagnetic Anomaly Near 52°K. Entropy and Free Energy. R. H. Busey and W. F. Giauque. *Journal of the American Chemical Society*, v. 74, Sept. 5, 1952, p. 4443-4446.

13806 Heats of Formation of Manganous Metasilicate (Rhodonite) and Ferrous Orthosilicate (Fayalite). E. G. King. *Journal of the American Chemical Society*, v. 74, Sept. 5, 1952, p. 4446-4448.

The heats of formation of the above were obtained by hydrofluoric acid solution calorimetry. Tables. 15 ref.

13807 The Heat of Neutralization of Hydrogen-Bentonite. W. H. Slabaugh. *Journal of the American Chemical Society*, v. 74, Sept. 5, 1952, p. 4462-4464.

Presents thermodynamic study of neutralization of hydrogen ions which indicates that there is a fundamental difference between 2 types of hydrogen ions, and that, during storage, there is a definite tendency for absorbed ions to become more intimately associated with clay micelles.

13808* Differential Thermal Analysis of Certain Iron Oxides and Oxide Hydrates. Mohamed A. Gheith. *American Journal of Science*, v. 250, Sept. 1952, p. 677-695.

Describes analysis of amorphous hydrated ferric oxides formed

both by direct neutralization of ferric-ion solutions and by oxidation of ferrous salts. With fresh solutions, the curves for both compounds show loss of absorbed H_2O followed by direct crystallization to hematite. 20 ref.

13809* Acid-Base Reactions in Water-Solvent Mixtures. (French.) Colette Bertin. *Analytica Chimica Acta*, v. 7, Aug. 1952, p. 105-126.

The constant of relative acidity of different acid-base couples, with respect to the reference couple H_3O+H_2O, was determined in some water-acetone mixtures. Two methods were used; conductimetry and potentiometry with the aid of a glass electrode. 31 ref.

13810* Introduction to the Study of Basic Insoluble Salts. II. Study of the Precipitation Curves of Basic Insoluble Salts. Solubility Products of Basic Salts and of Hydroxides. (French.) Max Geloso and Pierre Deschamps. *Analytica Chimica Acta*, v. 7, Aug. 1952, p. 127-140.

Results of experimental and theoretical investigation. Graphs and tables.

13811 Solubility and Freezing Point Depression of Nitrous Oxide in Liquid Nitrogen Dioxde. Arthur W. Rocker. *Analytical Chemistry*, v. 24, Aug. 1952, p. 1322-1324.

Description of a simple, rapid method for determination of solubility and freezing-point depression of gases in liquid NO_2 for work with liquid rocket oxidizers. This method proved useful for determining gas solubilities in highly corrosive liquids and can be performed with standard laboratory equipment. Graphs, tables, and schematic diagram.

13812* Catalyses by Copper Hydroxide in Hydrogen Peroxide and Peracetic Acid Solution as Well as in the Raschig Hydrazine Synthesis; Its Prevention by Magnesium Hydroxide. (German.) J. D'Ans and J. Mattner. *Angewandte Chemie*, v. 64, Aug. 21, 1952, p. 448-452.

Results of experiments on the above are charted, tabulated, and discussed. Mg $(OH)_2$ is used to remove traces of heavy metals, especially Cu, from alkaline solutions to prevent undesired catalytic effects. 19 ref.

13813* New Research on Copper Arsenates. (French.) Henri Guerin and Cyrille Duc-Mauge. *Bulletin de la Societe Chimique de France*, May-June 1952, p. 518-519.

Properties and formation of the two salts $As_2O_5 \cdot 5CuO \cdot 5H_2O$ and $As_2O_5 \cdot 3CuO \cdot (NH_4)_2O \cdot 5H_2O$ were investigated. Results indicate that they belong to another series than Cu salts unknown up to now.

13814* Behavior of Polonium Oxychloride in Various Organic Solvents. (French.) G. Bouissières. *Bulletin de la Société Chimique de France*, May-June 1952, p. 536-538.

Presents and discusses results of experiments on the above.

13815* The Phosphates of Barium. Study of the P_2O_5-BaO-H_2O System at 25°C. Laboratory Note. (French.) Henri Guerin and André Artur. *Bulletin de la Société Chimique de France*, May-June 1952, p. 562-563.

13816* Production and Absorption Spectra of Some Uranium Halides. Parts I and II. (French.) R. Rohmer, M. R. Freymann, R. Freymann, M. A. Chevet, and P. Hamon. *Bulletin de la Société Chimique de France*, May-June 1952, p. 598-611.

Reports on production of UCl_4, UCl_5, UBr_4, and UO_2Cl_2, in the solid state and in solution, and on their spectrosopic behavior. Results are tabulated, charted, and discussed. 79 ref.

13817 Newer Inorganic Pigments; a Survey of German Research. Athole G. Allen. *Chemical Age*, v. 67, Aug. 16, 1952, p. 227-228.

13818 Vaporization Rates and Heat-Transfer Coefficients for Pure Liquid Drops. Robert D. Ingebo. *Chemical Engineering Progress* (Engineering Section), v. 48, Aug. 1952, p. 403-408; disc., p. 408.

Vaporization rate data and surface-temperature data were obtained for 9 pure liquids evaporating from the surface of a porous sphere, and experimentally evaluated heat-transfer coefficients were found to correlate a semi-empirical equation that expresses Nusselt number for heat transfer as a function of a new dimensionless number and of thermal-conductivity ratio. Surface temperatures were determined for nitro-benzene, n-octane, benzene, methanol, acetone, water, ethanol, butanol, and carbon tetrachloride. A new method of predicting wet-bulb temperatures from boiling-point data and wet-bulb data for water was developed.

13819* The Experimental Determination of Solubilities. Howard K. Zimmerman, Jr. *Chemical Reviews*, v. 51, Aug. 1952, p. 25-65.

Methods reviewed are confined largely to the solubility of solids in liquids and of liquids in liquids. Important general considerations are temperature and equilibrium. Basic classes of methods are: constant-composition and variable-composition. Diagrams. 245 ref.

13820* Activity Coefficients of Nonelectrolyte Solutes in Aqueous Salt Solutions. F. A. Long and W. F. McDevit. *Chemical Reviews*, v. 51, Aug. 1952, p. 119-169.

An analysis and interpretation of available experimental data and relevant theories including hydration, electrostatic, Van der Waals forces, and internal-pressure concept. Graphs and extensive tables. 180 ref.

13821* Some Thermodynamic Properties of Formic Acid. Worden Waring. *Chemical Reviews*, v. 51, Aug. 1952, p. 171-183.

Presents tables for the above based on a self-consistent treatment combining statistical calculations with thermal data. 41 ref.

13822* Optimum Dilution in the Filtration of Viscous Liquids. (German.) A. F. Orlicek and A. Schmidt. *Chemie-Ingenieur-Technik*, v. 24, Aug. 1952, p. 457-458.

An equation was developed indicating, for a mineral oil and a diluent, the mixing ratio for which the mixture has the shortest filtration time. A nomograph for numerical evaluation is presented.

13823* New Methods of Applying Electrical Energy to Chemical Processes (Glow-Discharge Electrolysis) (German.) Alfons Klemenc. *Chimia*, v. 6, Aug. 15, 1952, p. 177-180.

Discussion on electrolytically-diluted H_2SO_4, on reduction with glow-discharge electrolysis, and on the behavior of aqueous solutions of organic compounds illustrate polar and nonpolar electrode reactions. Data are tabulated. 15 ref.

13824* Development of a Method of Measuring the Relationship of Specific Heats of Gases. (French.) Madeleine Aubert-Huetz. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences*, v. 235, July 7, 1952, p. 25-27.

Describes application of a method of forced oscillation for measuring the above. Limits of application are indicated; results are discussed .

13825* The Orthophosphates of Copper. Study of the P_2O_5-CuO-H_2O System at 60 and 18°C. (French.) Henri Guérin and Henri Kozicki. *Comptes Rendus hebdomadaires des Séances de l'Académie des Science*, v. 235, July 7, 1952, p. 52-54.

Describes systematic study of the above. Results are interpreted.

13826* Electron-Microsopic Investigation of Natural Phosphates. (Russian.) S. I. Vol'fkovich, L. B. Grinshpan, and A. B. Shekhter. *Doklady Akademii Nauk SSSR*, new ser., v. 85, July 1, 1952, p. 137-39.

Illustrated.

13827* Several Complex Compounds of Absolute Phosphorus Esters With Cu, Ag, and Gold Salts. (Russian.) A. E. Arbuzov and V. M. Zoroastrova. *Doklady Akademii Nauk SSSR*, new ser., v. 84, May 21, 1952, p. 503-506.

A study was made of structures and properties of the above compounds. Data are tabulated.

13828* The Influence of Pressure on the Solubility of Molecular Hydrogen in the β-Phase of the Palladium-Hydrogen System. (Russian.) P. S. Perminov, A. A. Orlov, and A. N. Frumkin. *Doklady Akademii Nauk SSSR*, new ser., v. 85, June 1, 1952, p. 749-752.

An experimental study was made on the above. Data are tabulated and charted.

26. *Chemistry—General, Inorganic, and Physical*

13829* The Influence of Concentrated Stresses on Diffusion in Solid Solutions. (Russian.) B. Ia. Liubov and N. S. Fastov. *Doklady Akademii Nauk SSSR*, new ser., v. 84, June 11, 1952, p. 939-941.

A mathematical discussion.

13830* Heterogeneous Equilibria in Aqueous Ternary Systems of Lithium Chloride With Barium, Strontium, and Calcium Chlorides. (Russian.) V. P. Blidin. *Doklady Akademii Nauk SSSR*, new ser., v. 84, June 11, 1952, p. 947-950.

An experimental investigation was made of the above systems. Data are tabulated and charted.

13831* A New Form of Dependence of Adsorption Values on Pressure. (Russian.) T. V. Antipina and A. V. Frost. *Doklady Akademii Nauk SSSR*, new ser., v. 84, June 11, 1952, p. 985-987.

Measurements were made of the sorption of ethyl alcohol and ethyl ether by Al_2O_3 at various temperatures and pressures. Data are charted.

13832* Deformation of the Crystalline Lattice and Dehydration Properties of Cr_2O_3. (Russian.) A. M. Rubinshtein, S. G. Kulikov, and N. A. Pribytkova. *Doklady Akademii Nauk SSSR*, new ser., v. 85, July 1, 1952, p. 121-124.

A laboratory study was made of the above. Data are tabulated and charted.

13833* The Problem of Diffusion of Gases in Carbon. (Russian.) E. S. Golovina. *Doklady Akademii Nauk SSSR*, new ser., v. 85, July 1, 1952, p. 141-144.

Temperature dependence of the diffusion coefficient of CO_2 through carbon plates was determined. Data are charted.

13834* Reactions With Heavy Nitrogen. IV. Production of $Na^{15}NO_2$ and $K^{15}NO_2$ From Heavy Nitrogen. (German.) Klaus Clusius and Hans Hürzeler. *Helvetica Chimica Acta*, v. 35, no. 4, 1952, p. 1103-1107.

Reports on production of pure crystallized $Na^{15}NO_2$ which can be kept indefinitely. Theoretical basis and experimental arrangement are indicated.

13835* Kineties of the Metallic Copper/Copper Ion Reaction. (German.) E. Quagliozzi and A. Resciguo. *Helvetica Chimica Acta*, v. 35, no. 4, 1952, p. 1227-1230.

Reports on measuring the time necessary for the exchange of Cu atoms of a Cu foil and the adjoining $CuSO_4$ solution by means of the isotope Cu^{64}. Proposes formula for the process. Its constants are calculated.

13836* An Algebraic Method for Calculation of Distilling Columns for Multicomponent Mixtures. (German.) T. Gäumann, Hs. H. Günthard, E. Heilbronner, and B. Messikommer. *Helvetica Chimica Acta*, v. 35, no. 4, 1952, p. 1300-1304.

Proposes a method for caluclation of the above, using only elementary matrix operations. Application of method to numerical problems is indicated.

13837 Calculation of the Number of Theoretical Plates in Distillation Columns. H. E. Watson. *Industrial Chemist and Chemical Manufacturer*, v. 28, Aug. 1952, p. 339-340.

Describes an improved method of plotting a more accurate curve for the above. Graphs.

13838 Thermal Force on an Aersol Particle in a Temperature Gradient. R. L. Sacton and W. E. Ranz. *Journal of Applied Physics*, v. 23, Aug. 1952, p. 917-923.

Report on measurements of droplets of paraffin oil and castor oil suspended in air, showing effect of temperature gradient, particle size, and particle material. The thermal force is directly proportional to the temperature gradient prevailing in the gas and to the particle diameter. It is an inverse function of thermal conductivity of the aerosol. Schematic diagrams and charts. 39 ref.

13839 Theory of Ion Exchange for Polyelectrolytes Undergoing Electrolytic Transferenee. Frederick T. Wall and Philip F. Grieger. *Journal of Chemical Physics*, v. 20, Aug. 1952, p. 1200-1211.

Experiments show that polymeric ions generally have associated with them a large number of small ions of opposite charge which are considered bound to the polymeric ions, and are capable of exchanging with free ions in solution. It is possible to determine rate of this exchange by means of certain electrolytic transference experiments which make use of radioactive tracers. The theory of such transference experiments is worked out by formulating and solving appropriate differential equations subject to certain boundary conditions. Results of these transference studies can be used for evaluating ion-rate-exchange constants.

13840 Electrolytic Properties of Aqueous Solutions of Polyacrylic Acid and Sodium Hydroxide. III. The Rate of Sodium Ion Exchange Between Polyacrylate and Free Sodium Ions. Frederick T. Wall, Philip F. Grieger, John R. Huizenga, and Robert H. Doremus. *Journal of Chemical Physics*, v. 20, Aug. 1952, p. 1206-1211.

Above were investigated by an electrolytic-transference method. On the assumption that there is a single exchange process, rate constants were computed and the theory was found to provide a moderately good representation of the data. A much better correlation is obtained, however, if it is assumed that there are 2 exchange processes, one very rapid and the other very slow. Tables, graphs, and formulas.

13841 Theory of Catalysis of Nucleation by Surface Patches. David Turnbull. *Journal of Chemical Physics*, v. 20, Aug. 1952, p. 1327.

Brief mathematical analysis of the above.

13842* Cryoscopy in Molten Lithium Borate. (French.) Georges Zarzycki. *Journal de Chimie Physique et de Physico-Chimie Biologique*, v. 49, June 1952, p. C34-C36; disc., p. C36-C37.

Reviews previous work and presents results of new experiments. Graphs.

13843* Determination of Crystallographic Varieties of Titanium Oxide. (French.) Ch. Legrand. *Journal des Recherches du Centre National de la Recherche Scientifique*, June 1952, p. 181-183.

Describes application of the Debye-Scherrer method to the above. Results are indicated.

13844* Reactions of Iodine. I. Reaction Between Iodine & Sodium Formate in Dark. II. Reaction Between Iodine & Formic Acid. S. L. Bafna, W. V. Bhagwat, and G. L. Maheshwari. **III. Reaction Between Iodine & Sodium Malonate.** S. L. Bafna, W. V. Bhagwat, and M. A. Tilak. *Journal of Scientific & Industrial Research*, v. 11 B, June 1952, p. 226-233.

22 references.

13845* Filtration of Clay Suspensions. (German.) W. v. Engelhardt and E. Schindewolf. *Kolloid Zeitschrift*, v. 127, July 1952, p. 150-164.

An equation for computing rate of filtering is shown to be inaccurate because of changing conditions with progress of filtration. Effects of pressure, electrolyte content, and clay content on rate of filtration are discussed. Tables, graphs, and references.

13846* Electronic Structure of the Heaviest Elements. J. K. Dawson. *Nucleonics*, v. 10, Sept. 1952, p. 39-45.

A revision of the "actinide hypothesis" is indicated by the review of magneto-chemical data made available since 1949. On the basis of ionic properties, Th, Pa, and U resemble elements of Groups IV, V, and VI in the periodic table. 51 ref.

13847* Thermodynamic Considerations in the Conversion of Methane With Water Vapor. (Italian.) C. Padovani, G. Salvi, and G. Distante. *Rivista dei Combustibli*, v. 6, June 1952, p. 377-391.

With the aid of thermodynamic calculations, equilibrium compositions of gas mixtures formed by reaction of CH_4 with H_2O at different temperatures and H_2O-CH_4 ratios were determined. Reports for different temperatures the lowest H_2O-CH_4 ratios that do not cause carbon-black formation.

13848 Two-Phase Equilibrium in Binary and Ternary Systems. IX. Derivation of the General Equation Defining a Small Change at Equilibrium. R. F. Strickland. *Proceedings of the Royal Society*, ser. A, v. 214, Aug. 7, 1952, p. 36-43.

A general method of calculating partial differential relations in above system is also described.

13849 The Influence of Pressure on the Equilibrium Between Carbon Dioxide and Air. T. J. Webster. *Proceedings of the Royal Society*, ser. A, v. 214, Aug. 7, 1952, p. 61-71.

Equilibrium between solid CO_2 and air was examined at pressures from atmospheric to 200 atm. and at temperatures from −110 to −196°C. Graphs and tables. 10 ref.

13850 The Theory of Regular Solutions. J. S. Rowlinson. *Proceedings of the Royal Society*, ser. A, v. 214, Aug. 21, 1952, p. 192-206.

Shows how usual theory of regular solutions, which is based on the assumption that all molecules are on the sites of a lattice, is modified.

13851 A Theoretical Treatment of Cation Exchangers. I. The Prediction Of Equilibrium Constants From Osmotic Data. E. Glueckauf. *Proceedings of the Royal Society*, ser. A, v. 214, Aug. 21, 1952, p. 207-225.

Theories put forth to explain ion-exchange phenomena in natural and synthetic materials are examined. It is assumed that free energy of exchanger is a function of its volume and composition only, and that exchanger phase obeys laws of concentrated electrolyte solutions so far as they are known. 21 ref.

13852* A Thermochemical Approach to the Study of Ion Exchange. N. T. Coleman. *Soil Science*, v. 74, Aug. 1952, p. 115-125.

Reports some preliminary results of calorimetric measurement of heats of neutralization of H-exchange resins and clays and of heats of reaction between exchange resin salts and electrolyte solutions. Also, relates measured heats of ion exchange to other thermodynamic functions. Tables. 12 ref.

13853* Measuring the Modulus of Shear of Viscous Liquids. (German.) Hans Fromm and Walter Hartung. *Technik*,, v. 7, Mar. 1952, p. 126-130.

Apparatus for measuring above and method of evaluating results are described. Diagrams, graphs, and tables.

13854* High-Pressure Investigations. I. Densities and Melting Curves. II. The Viscosity of Compressed Gases. (German.) E. Kuss. *Zeitschrift für angewandte Physik*, v. 4, June 1952, p. 201-207.

Part I describes equipment and procedure for determining densities and melting curves of nitrobenzene, nitrotoluene, and dioxane as a means of studying structure of liquids. Part II describes a new capillary viscosimeter for determining viscosities of gases and slightly viscous liquids. Diagrams, tables, and graphs. 19 ref.

13855* Formation of Nuclei and Orientation of Materials Deposited on Different Types of Crystalline Substances. (German.) A. Neuhaus. *Zeitschrift für Elektrochemie; Berichte der Bunsengesellschaft für Physikalische Chemie*, v. 56, no. 5, 1952, p. 453-458.

Review of recent methods and results on above includes discussion of experimental results obtained by the high vacuum process and their importance to the kinetics of reactions and molecular energy. Inorganic salts, organic compounds, and silver were deposited on nonmetallic bases. Photomicrographs and tables. 23 ref.

13856* Recent Developments in Nucleation Theory. (English.) Howard Reiss. *Zeitschrift für Elektrochemie; Berichte der Bunsengesellschaft für Physikalische Chemie*, v. 56, no. 5, 1952, p. 459-464.

A brief review of the classical theory of gas-phase nucleation, in its most modern form, is presented, and criticized. Subsequently, a brief resume of a recent more logical theory, based on statistical mechanics, is given. 28 ref.

13857* Correlation Between Potential and Dissolving Rate of Salts. (German.) Walther Jaenicke. *Zeitschrift für Elektrochemie; Berichte der Bunsengesellschaft für Physikalische Chemie*, v. 56, no. 5, 1952, p. 473-476.

Mathematical and experimental studies reveal nearly linear correlation of dissolving rate of NaCl in a cyanide solution with the potential of the electrolyte. Graphs.

13858* Gas Adsorption and Surface Structure. (German.) G. F. Hüttig and O. Theimer. *Zeitschrift für Elektrochemie; Berichte der Bunsengesellschaft für Physikalische Chemie*, v. 56, no. 5, 1952, p. 490-496; disc., p. 496.

Review of the theory of adsorption follows a discussion of various adsorption experiments in order to determine the relationship between adsorption and surface inhomogeneities. Data are graphed and tabulated. 17 ref.

13859* Mass Spectrometric Investigation of SH_2, SeH_2, PH_3, SiH_4, and GeH_4. (German.) N. Neuert and H. Clasen. *Zeitschrift für Naturforschung*, v. 7a, June 1952, p. 410-416.

Relative ionization and dissociation frequencies as well as critical potential for ionization and dissociation by electron impact for above gases were studied.

13860* Separation of Binary Mixtures. (German.) Alfred Klemm. *Zeitschrift für Naturforschung*, v. 7a, June 1952, p. 417-421.

Solves mathematically the nonlinear differential equation for binary mixtures in an infinitely long tube closed on one end. The effect of time on the separating factor at the end of the tube for different mixture ratios is graphically explained and compared with that of finitely long tubes and mixture ratios ranging from 0 to infinity. Graphs and references.

13861* The Dissociation of Sulfur Vapor. II. (German.) H. Braune and E. Steinbacher. *Zeitschrift für Naturforschung*, v. 7a, July 1952, p. 486-493.

Results of spectrophotometric investigation in the visible region. Tables and graphs.

Books

13862 Molybdenum Compounds; Their Chemistry and Technology. D. H. Killeffer and Arthur Linz. 407 pages. 1952. Interscience Publishers, New York. (QD181.M7 K55m)

This comprehensive work includes a chapter on structural chemistry of Mo, by Linus Pauling. The 3rd chapter is devoted to physical, chemical, and mechanical properties of Mo itself. Each chapter is followed by a bibliography of reasonable length. However, the chapter on Mo catalysts occupies about half of the book by virtue of its extensive indexed catalyst bibliography.

13863 Destillier- und Rektifiziertechnik. (Distillation and Rectification Technology.) Ed. 2. Emil Kirschbaum. 465 pages. 1950. Springer-Verlag, Berlin, Germany. (TP156D5 K63d2)

Numerous diagrams, tables, and graphs supplement this comprehensive discussion on the distillation of and rectification of insoluble, partly soluble, and completley soluable mixtures. Special emphasis is given to procedure, conditions, and experimental results obtained with different types of equipment. Footnote references plus a bibliography of 114 ref.

13864 Die Grundlagen der Angewandten Thermodynamik. (Principles of Applied Themodynamics). Kurt Nesselmann. 320 pages. 1950. Springer-Verlag, Berlin, Germany. (QC311 N37g)

Tables, graphs, diagrams, and numerous references.

13865 Lectures on Inorganic Chemistry. A. E. Van Arkel. 120 pages. 1952 National Research Council, Ottawa. (Mimeographed) (QD151 Ar48L)

Lectures, presented while the author was Visiting Professor at the National Research Council, deal with thermodynamics; halides, oxides, calcides and their reactions; complexes, etc. Uses approach of treating inorganic compounds as essentially ionic, and making corrections for the covalent contribution. Diagrams.

See also:

13234 (crystal growth and dislocations)
13235 (zones and precipitates in super saturated solid solutions)
13245 (reactions of TiI_4)

26. *Chemistry—General, Inorganic, and Physical*

13435 (chromatography of various inorganic substances)
13447 (phenomena at polarizable Hg electrodes)
13873 (ionization constants of iodoxybenzoic acids)
13889 (statistical mechanical models of polyelectrolytes)
14022 (cation-exchange equilibria on clay minerals)

27. CHEMISTRY—ORGANIC

13866 Some Inhibitors and Retarders in the Polymerization of Liquid Vinyl Acetate. II. 1,3,5,-Trinitrobenzene and Sulfur. Paul D. Bartlett and Harold Kwart. *Journal of American Chemical Society*, v. 74, Aug. 20, 1952, p. 3969-3973.

Above compounds are both strong inhibitors of the polymerization of liquid vinyl acetate, but the kinetics of the inhibited polymerization, followed dilatometrically under the simplified conditions of Part I of this series, does not fit the equations which apply to the moderate and strong inhibitors there described. This was found to be due to the fact that trinitrobenzene, in the act of stopping two polymerization chains, is converted into another inhibitory substance whose rate constant for reaction with growing chains is only 7% of that of trinitrobenzene itself. A kinetic equation is derived which fits the experimental facts and permits determination of relative terminator efficiencies. A stepwise mechanism for the chain-terminating action of S is proposed.

13867 N-Aryl-N'-Alkyloxamides for the Identification of Primary Alkyl Amines. A. G. Richardson, J. Stanton Pierce, and E. Emmet Reid. *Journal of American Chemical Society*, v. 74, Aug. 20, 1952, p. 4011-4012.

Report on convenient and reliable regents for identification of aliphatic amines. These reagents have the great advantage over acid chlorides and aryl isocyanates in that they are insensitive to H_2O and alcohols. 11 ref.

13868 Nitrogen Derivatives of Dibenzoselenophene. Eugene Sawicki and Francis E. Ray. *Journal of American Chemical Society*, v. 74, Aug. 20, 1952, p. 4120-4121.

Discusses dibenzoselenophene which was nitrated and the nitro derivatives reduced to the amino compound. The acetyl- and ethyl-urethan derivatives were then prepared and from a consideration of u.v. absorption spectra. It is concluded by the authors that nitration has occurred in the 2-position.

13869 Reactions of Hydrocarbons Induced by Alkyl Fluoride Boron Trifluoride. IV. Stoichiometry of the Self-Alkylation of Isobutane. Conrad K. Donnell and Robert M. Kennedy. *Journal of American Chemical Society*, v. 74, Aug. 20, 1952, p. 4162-4164.

Explains the relation between the amount of BF_3 charged and the total amount of reaction obtained with regard to the above.

13870 Metal-Amino Acid Complexes. II. Polarographic and Potentiometric Studies on Complex Formation Between Copper (I) and Amino Acid Ion. Norman C. Li and Edward Doody. *Journal of American Chemical Society*, v. 74, Aug. 20, 1952, p. 4184-4188.

A study of the more complicated systems in which the heavy metal ions interact with proteins and enzymes. Tables and graphs.

13871 Nopol. III. Thermal Isomerization in the Liquid Phase. Joseph P. Bain, Albert H. Best, and Robert L. Webb. *Journal of the American Chemical Society*, v. 74, Sept. 5, 1952, p. 4292-4296.

Reports that thermal isomerization of nopol is analogous to that of a-pinene and shows that products of pyrolysis are dipentene-7-carbinol, the alloöcimenecarbinol, and partly racemized nopol. Graphs. 14 ref.

13872 Telomerization of Vinyl Monomers With Hydrogen Chloride. T. A. Ford, W. E. Hanford, J. Harmon, and R. D. Lipscomb. *Journal of The American Chemical Society*, v. 74, Sept. 5, 1952, p. 4323-4326.

Reports that ethylene reacts with hydrogen chloride in presence of free radical initiators and water to yield mixtures of straight-chain primary alkyl chlorides having even numbers of carbon atoms.

13873 The Ionization Constants at 50° of m- and p-Iodoxybenzoic Acids. Aksel A. Bothner and Avrom I. Medalia. *Journal of the American Chemical Society*, v. 74, Sept. 5, 1952, p. 4402-4408.

Ionization constants of benzoic, m-iodobenzonic p-nitrobenzoic, m-iodoxybenzoic, and p-iodoxybenzoic acids in aqueous solutions at 50° were determined from pH-titration curves. Derived values are given. 14 ref.

13874 The Effect of Sodium Oxide on the Chromium Oxide Catalyzed Conversion of Aldehydes to Ketones. J. R. Coley and V. I. Komarewsky. *Journal of the American Chemical Society*, v. 74, Sept. 5, 1952, p. 4448.

Briefly describes procedures and results of experiments of the above.

13875 Dissociation Temperatures of Urea Complexes of Long-Chain Fatty Acids, Esters, and Alcohols. H. B. Knight, Lee P. Witnauer, Joseph E. Coleman, Wilfred R. Noble, Jr., and Daniel Swern. *Analytical Chemistry*, v. 24, Aug. 1952, p. 1331-1334.

A report of a technique for preparation in high yield (75-100%) of urea complexes from 42 long-chain compounds, consisting of fatty acids, methyl and vinyl esters, alcohols, a mono- and diglyceride, and a vinyl ether. 21 ref.

13876* Fundamental and Critical Remarks Concerning the Theory of the Keto-Enol Conversion. Results of Recent Measurements of Keto-Enol Equilibria of β-Diketones and Their Temperature Dependence in the Gaseous State. (German.) *Angewandte Chemie*, v. 64, Aug. 7, 1952, p. 409-417.

38 references.

13877* Inclusion Compounds. (German.) Friedrich Cramer. *Angewandte Chemie*, v. 64, Aug. 21, 1952, p. 437-447.

Presents comprehensive report on above types of compounds. Diagrams and illustrations show their molecular structures. They include urea and thiourea adducts, dinitrodiphenyl aducts, cyclodextrin adducts, choleic acids, clathrates, gas hydrates, and macromolecular inclusion compounds. 46 ref.

13878* Some Recent British Contributions to the Chemistry of Biologically-Active Substances. W. A. Sexton. *Export Review of the British Drug and Chemical Industries*, v. 13, Aug. 1952, p. 37-41.

24 references.

13879* Kinetic Studies on the Hydrolysis of Halides of the Allyl Type. A. Kirrmann, H. Pourrat, R. Schmitz, and E. Saïto. **I. General Considerations.** A. Kirrman, H. Pourrat, R. Schmitz, and E. Saito. **II. Influence of Solvents and of Concentrations.** H. Pourrat and R. Schmitz. **III. Influence of Ionic Force.** R. Schmitz. **IV. Comparison With Non-Allylic Halides.** E. Saïto and R. Schmitz. **V. Discussion of the Results.** A. Kirrmann, R. Schmitz, and E. Saïto. (French.) *Bulletin de la Société Chimique de France*, May-June, 1952, p. 502-517.

Numerous tables and graphs. 53 ref.

13880* Semimicro Synthesis of Acetic Acid of High Specific Activity, Marked With Radiocarbon 14 on the Carboxyl Group. (French.) Roland Muxart, Pascaline Daudel, Claude Rigolet, and Robert Melet. *Bulletin de la Société Chimique de France*, May-June 1952, p. 577-580.

15 references.

13881 The Wiswesser Line Formula Notation. William J. Wiswesser. *Chemical and Engineering News*, v. 30, Aug. 25, 1952, p. 3523-3526.

Gives details of another effort in the search for a universally acceptable and usable international chemical notation for organic compounds.

13882* Dimerization Reactions in Sunlight. Ahmed Mustafa. *Chemical Reviews*, v. 51, Aug. 1952, p. 1-23.

Deals mainly with photodimerization reactions carried out in sunlight, leading to products of known constitution. Tables. 100 ref.

13883* Biosynthesis of Glutamine Hydrocarbons and Albumens Traced by Radioactive Carbon. (Russian.) A. M.

Kuzin and V. I. Merenova. *Doklady Akademii Nauk SSSR*, new ser., v. 85, July 1, 1952, p. 181-183.

Sugar-beet leaves in special apparatus were used in experiments on the above. Procedure and results are discussed.

13884* Mechanism of Synthesis of Hydrocarbons From Carbon Monoxide and Hydrogen on Iron Catalysts. (Russian.) I. B. Rapoport and M. M. Leokovich. *Doklady Akademii Nauk SSSR*, new ser., v. 84, June 1, 1952, p. 725-727.

Data are tabulated and discussed.

13885* Graphic Tracing of Reactions of Hydrocarbon Mixtures. H. I. Waterman and H. Booy. *Journal of the Institute of Petroleum*, v. 38, July 1952, p. 526-531.

During processing of mineral oil, changes taking place are reflected in magnitude and ratio of number of aromatic and naphthenic rings per average molecule. Changes caused by opening or closing of rings, hydrogenation or dehydrogenation, cracking and polymerization or alkylation are presented graphically.

13886* Pyrolysis Kinetics of Aliphatic Aldehydes in the Gaseous Phase. I. Induction by Tertiary Dibutyle Peroxide of the Pyrolysis of Acetaldehyde Between 420 and 485°K. II. Sensitization by Diacetyl of the Pyrolysis of Acetaldehyde Between 680 and 760°K. André Boyer, Michel Niclause, and Maurice Letort. **III. Pyrolysis of Propionaldehyde Between 690 and 770°K. Its Sensitization by Diacetyl.** André Boyer and Michel Niclause. (French.) *Journal de Chimie Physique et de Physico-Chimie Biologique*, v. 49, June 1952, p. 337-362.

39 references.

13887* The Inhibition of Enzyme Formation by Amino Acid Analogues. Harlyn O. Halvorson and S. Speigelman. *Journal of Bacteriology*, v. 64, Aug. 1952, p. 207-221.

Results of experimental investigation are charted, tabulated, and discussed. 24 ref.

13888* Effect of Amino Acids, Purines, and Pyrimidines on Carbon Dioxide Fixation by Serratia Marcescens. Dorothy J. McLean and Elizabeth F. Purdie. *Journal of Biological Chemistry*, v. 197, Aug. 1952, p. 539-545.

25 references.

13889 Some Statistical Mechanical Models of Elastic Polyelectrolytes and Proteins. Terrell L. Hill. *Journal of Chemical Physics*, v. 20, Aug. 1952, p. 1259-1273.

3 statistical mechanical models developed for use in connection with problems of muscle action, polyelectrolyte fibers or gels, fibrous proteins in general and ion-exchange resins. 1st, a statistical mechanical version of the "autone" model of Varga, Szent-Gyorgyi, Gergely, and Laki. 2nd, a charged rubber-like cylindrical fiber. 3rd, an equilibrium statistical theory of the α-β transformation in fibrous proteins. Graphs and formulas. 30 ref.

13890 Viscosties of Some Lower Aliphatic Alcohols at Constant Volume. A. Jobling. *Journal of Chemical Physics*, v. 20, Aug. 1952, p. 1296-1298.

Brief review of published experimental data on the above for methyl, ethyl, m-propyl, isobutyl, and n-octdecyl alcohols. Graphs.

13891 Mechanisms of Exchange and Hydrogenation Reactions of Olefins. Marie Clare Markham, Mary Colman Wall, and Keith J. Laidler. *Journal of Chemical Physics*, v. 20, Aug. 1952, p. 1331-1332.

In a recent letter, Wagner, Wilson, Otvos, and Stevenson proposed a mechanism for exchange and hydrogenation, involving migrations of H and D atoms among adsorbed hydrocarbon residues. Proposes a somewhat different mechanism and shows its application to ethylene.

13892* Some Relationships Between Organosilicon Compounds and Analogous Carbon Compounds. Henry Gilman and G. E. Dunn. *Journal of Polymer Science*, v. 9, Sept. 1952, p. 253-264.

Makes some general comparisons between the organic chemistry of Si and that of C. 26 ref.

13893 Reactions of Phenyl Radicals in Solution and in the Gaseous Phase. M. T. Jaquiss and M. Szwarc. *Nature*, v. 170, Aug. 23, 1952, p. 312-314.

Study of above which shows that phenyl radicals react differently with aliphatic and aromatic solvents. With the former they seem to undergo an atom transfer reaction; while with aromatic solvents, substitution products are formed.

13894 The Kinetics of the Fatty Acid Esterification of Poly-Alcohols. W. Rubin. *Journal of the Oil & Colour Chemists' Association*, v. 35, Aug. 1952, p. 418-430.

A study of above shows that kinetics of esterification are of the 2nd order. Relationship between activation energy and collision frequency is discussed; and application to production is outlined. Graphs and tables. 14 ref.

13895 Arylalkylation of Phenols and Naphthols With Derivatives of Styrene. Ng. Ph. Buu-Hoï, Henri LeBihan, Fernand Binon, and Pierre Maleyran. *Organic Chemistry*, v. 17, Aug. 1952, p. 1122-1127.

An investigation of the behavior of some substituted derivatives of styrene in arylalkylation reactions involving phenols and naphthols.

13896 Organosilicon Aldehydes. Charles A. Burkhard and Dallas T. Hurd. *Organic Chemistry*, v. 17, Aug. 1952, p. 1107-1109.

Brief experimental report of the isomeric aldelhydes formed by the action of CO + H_2 with olefins in the presence of a metal-carbonyl catalyst.

13897 Propylchlorogermanes and Propylgermanes. Otto H. Johnson and Lerroy V. Jones. *Organic Chemistry*, v. 17, Aug. 1952, p. 1172-1176.

Reports the results from the preparation of propyltrichlorogermane by the germanium tetrachloride propyllithium reaction. Also reviews reduction of propyltrichlorogermane and mixtures of propylchlorogermanes by lithium aluminum hydride. 17 ref.

13898* Catalytic Chemistry of Hydrocarbons. A. V. Grosse. *Record of Chemical Progress*, v. 13, 1952, p. 55-64.

Includes general introduction, and review of catalytic reactions of hydrocarbons among themselves and with other substances. Tables. 33 ref.

13899* Molecular Complexes of Iodine With Olefinic Compounds. (English.) J. A. A. Ketelaar and C. Van De Stolpe. *Recueil des Travaux Chimiques des Pays-Bas*, v. 71, July 1952, p. 805-808.

From ultraviolet absorption spectra, equilibrium constants were determined for formation of complexes of iodine with diisobutylene, cis-dichloroethane, trichloroethene, and tetrachloroethene, as active components in n-hexane as a solvent. Relation of the tendency towards association with double-bond character is stressed.

13900 The Kinetics of the Thermal Decomposition of Nornal Paraffin Hydrocarbons. V. Order of Reaction Over Extended Ranges of Pressure. F. J. Stubbs, K. U. Ingold, B. C. Spall, C. J. Danby, and Cyril Hinschelwood. *Proceedings of the Royal Society*, ser. A, v. 214, Aug. 7, 1952, p. 20-35.

Results of systematic investigation of reactions concerned in thermal decomposition of ethane, propane, n-butane, n-pentane, and n-hexane. Tables and graphs.

13901* Formation of Organic Silicon Compounds. Part 2. Reactions Between SiH_4 and Vinyl Chloride. (German.) G. Fritz. *Zeitschrift für Naturforschung*, v. 76, July 1952, p. 379-385.

Books

13902 Five-Membered Heterocyclic Compounds With Nitrogen and Sulfur or Nitrogen, Sulfur, and Oxygen (Except Thiazole). L. L. Bambas. 403 pages. 1952. Interscience Publishers, New York. (QD400 B21f)

4th volume of a series of monographs devoted to a detailed and comprehensive presentation of heterocyclic chemistry by a group of authorities.

13903 Glycols. George O. Curme, Jr. and Franklin Johnston, editors. 389 pages. 1952. Reinhold Publishing Corp., New York

27. *Chemistry—Organic*

(American Chemical Society, Monograph Series 114) (QD305. A4 C93g)

Comprehensive technical treatment covering such aspects as production, physical properties, applications, derivatives, condensation, polymers, physiological aspects, analytical methods, and some related compounds and materials. Photographs, tables, charts, graphs, and extensive chapter bibliographies.

13904 Chemie der beta-Dicarbonyl-Verbindungen. (Chemistry of the beta-Dicarbonyl Compounds.) Hans Henecka. 409 pages. 1950. Springer-Verlag, Berlin, Germany. (QD305.A6 H38c)

Summary on above includes discussion of multiplicity of possible reactions of such compounds and explanation of mechanisms of reactions proposed by different theories. Tables and numerous references.

See also:
13424 (organic compounds—isotopic assay)
13426 (chromatography of organic compounds)
13435 (chromatography of various organic substances)
13455 (paper chromatography of organic acids)
13456 (chromatographic separation of sugars and amino acids)
13820 (nonelectrolyte solutes in aqueous salt solutions)
13844 (organic reactions of iodine)
14214 (aza-indolizines—chemistry of)
14239 (British medicinal chemicals)

28. PLASTICS AND HIGH POLYMERS

13905* Redux for Spars. *Aeroplane*, v. 83, Aug. 15, 1952, p. 216-218.

Work was done by the Fokker Co. on application of Redux bonding process to composite spar-boom construction. Main points from results, and comparison of compression strength of riveted and Redux bonded booms are given. Photographs and tables.

13906 Reactivity Ratios of Conjugated Dienes Copolymerized in Emulsion at 5°. R. D. Gilbert and H. Leverene Williams. *Journal of American Chemical Society*, v. 74, Aug. 20, 1952, p. 4114-4118.

Describes copolymerization of isoprene and dimethylbutadiene with butadiene and of butadiene with styrene in an emulsion system at 5°C. From the combining ratio of the monomers of low conversion, reactivity ratios of the copolymerizing pairs were calculated. A terpolymer of butadiene-isoprene-dimethylbutadiene was prepared and compared with polybutadiene. It was found to have a higher freezing point but superior retraction properties at low temperatures. Tables. 24 ref.

13907* Sizes for Glass Textiles for Reinforcing Polyester Plastics. L. P. Bielefeld and T. E. Philipps. *American Dyestuff Reporter*, v. 41, Aug. 18, 1952, p. 501-506.

Outlines processing operations in which molten glass is converted into fibrous forms used for reinforcing plastics, requirements of a size which give satisfactory handling and performance characteristics to the fibers, procedures for evaluating a size, and comparison of handling and performance characteristics of glass fibers which are surface-treated with various sizes.

13908 An Improved Water Extraction Test for Polyvinyl Chloride Elastomers. E. F. Schulz. *ASTM Bulletin*, July 1952, p. 75-78.

Test for plasticized vinyl sheeting is unique in that activated carbon is employed to overcome low plasticizer solubility of a limited volume of the extractant. Water extraction is shown to decrease markedly with increased specimen thickness, increase exponentially with rising test temperature, increase with increasing plasticizer content, and differ greatly between various plasticizer systems. A definite correlation is evident between extraction tests by an existing method and the activated-carbon technique.

13909* Frictional and Elastic Properties of High Polymeric Materials. B. Lincoln. *British Journal of Applied Physics*, v. 3, Aug. 1952, p. 260-263.

Interrelationships of above properties are discussed. By applying Hertz's equation for deformation of solids in contact, it is shown that while the asperities on metallic surfaces are deformed plastically even at the smallest loads, this is not necessarily true of materials having lower elastic modulus. Observed decrease in friction of some high polymers on rough surfaces may be explained in terms of elastic deformation of the asperities. 10 ref.

13910 Plastics Equipment Reference Sheet. Raymond B. Seymour and Robert H. Steiner. *Chemical Engineering Progress* (Engineering Section), v. 48, Aug. 1952, p. 430.

Deals with polyester-glass laminated plastics. Covers compositions, applications, machinability, temperature limitations, and corrosion resistance to a wide variety of common chemicals and industrial materials.

13911* The Mechanism of Fracture of Rubber. (Russian.) G. M. Bartenev. *Doklady Akademii Nauk SSSR*, new ser., v. 84, May 21, 1952, p. 487-490.

An experimental study was made of the failure of rubber tensile specimens. Typical fractures are illustrated. Results are discussed.

13912* Influence of Molecular Interaction on Strength of High Polymers With Developed Space Structure. (Russian.) V. E. Gul. *Doklady Akademii Nauk SSSR*, new ser., v. 85, July 1, 1952, p. 145-148.

A theoretical discussion of the above. Previously published data are used for confirmation.

13913 Time-Temperature Dependence of Linear Viscoelastic Behavior. F. Schwarzl and A. J. Staverman. *Journal of Applied Physics*, v. 23, Aug. 1952, p. 838-843.

Discusses the question whether or not, in the study of linear viscoelastic behavior of a materials, change of temperature is completely equivalent to a shift of the logarithmic time scale. Micro-rheological conditions for thermo-rhelogically simple behavior are discussed, with particular reference to polymers.

13914 Interdiffusion of Polyvinyl Acetate With a Series of Solvents. A. T. Hutcheon, R. J. Kokes, J. L. Hoard, and F. A. Long. *Journal of Chemical Physics*, v. 20, Aug. 1952, p. 1232-1236.

Discusses diffusion of polymers in the intermediate concentration regions and tests applicability of some existing theories for the process. The Lamm-scale method was used to determine concentration as a function of position in the diffusion cell. By mathematical analysis, diffusion coefficient was evaluated as a function of concentration for interdiffusion of polyvinyl acetate with triacetin and acetone. Graphs. 20 ref.

13915* Rates of Thermal Degradation of Polystyrene and Polyethylene in a Vacuum. Samuel L. Madorsky. *Journal of Polymer Science*, v. 9, Aug. 1952, p. 133-156.

Study was made of rates of thermal degradation of the above by measuring rates of loss of weight by means of a tungsten spring balance in a vacuum. Graphs and tables. 15 ref.

13916* Branching Mechanisms in the Polymerization of Vinyl Acetate. O. L. Wheeler, E. Lavin, and R. N. Crozier. *Journal of Polymer Science*, v. 9, Aug. 1952, p. 157-169.

A simplified kinetic analysis for degree of branching in terms of 6 rate-constant ratios. 4 of these ratios were determined by very slow photopolymerization of highly purified vinyl acetate at 70°C. to different degrees of conversion. Number-average degrees of polymerization were estimated by quantitative determination of double-bond end groups. A 5th ratio was estimated less accurately by viscosity measurements on the polymers after alcoholysis and acetylation. A rough estimation of the 6th ratio was based on a cross-linking experiment. These ratios were used to accurately predict degradation on hydrolysis of a series of low-molecular-weight polymers. Graphs and tables.

13917* Intrinsic Viscosity-Molecular Weight Relation for Polymethyl Methacrylate: Effect of Size Distribution. Bahattin Baysal and Arthur V. Tobolsky. *Journal of Polymer Science*, v. 9, Aug. 1952, p. 171-176.

Relation between number-average degree of polymerization and intrinsic viscosity was obtained and compared with reported relationships for fractionated polymers under the same conditions.

13918* Studies in Continuous Polymerization. F. T. Wall, C. J. Delbeco, and R. E. Florin. *Journal of Polymer Science*, v. 9, Aug. 1952, p. 177-192.

Theory of above was developed in a form that permits experimental verification. Under selected experimental conditions it was found possible to predict the asymptotic, or steady state, conversion without recourse to any assumptions concerning kinetic order of the polymerization reaction. The theory was compared with results obtained for continuous solution polymerization of styrene. A method for obtaining a composition fractionation of styrene-methyl methacrylate copolymer was developed. Tables and graphs. 10 ref.

13919* Molecular Weight Distributions in Polystyrene. II. Experimental. Raymond F. Boyer. *Journal of Polymer Science*, v. 9, Sept. 1952, p. 197-218.

The molecular-weight distribution of a heterogeneous polystyrene can be obtained in principle by observing the cumulative volume of precipitate which corresponds to increasing additions of nonsolvent to a dilute solution of the polymer in question. This paper is concerned with experimental aspects of the method: size of container, initial concentration of polymer, choice of solvent and nonsolvent, manner of adding the nonsolvent, reequilibration of existing precipitate after each nonsolvent addition, and experimental difficulties. The only system studied was polystyrene-benzene-methanol. Preliminary calibration data are presented, as well as a number of experimental distribution curves on fractions, mixed fractions, and heterogenous polymers. 23 ref.

13920* Preparation of 1,3,5-Trivinyl-2,4,6-Trichlorobenzene and Its Copolymerization With Styrene. Sidney D. Ross and Moushy Markarian. *Journal of Polymer Science*, v. 9, Sept. 1952, p. 219-228.

13921* Normal and Cross-Linked Polystyrene. II. Viscosity Behavior of Polystyrene Cross-Linked in Emulsion Polymerization. L. H. Cragg and J. A. Manson. *Journal of Polymer Science*, v. 9, Sept. 1952, p. 265-278.

16 references.

13922* Instrument for Determining Shear Dependence of Intrinsic Viscosity of High Polymer Solutions. J. Schurz and E. H. Immergut. *Journal of Polymer Science*, v. 9, Sept. 1952, p. 279-281.

Describes and diagrams simple apparatus and procedure. Gives theory of its operation.

13923* Polymerization Rate of Methacrylic Acid. S. H. Pinner. *Journal of Polymer Science*, v. 9, Sept. 1952, p. 282-285.

Shows effect of pH on the above, upon copolymerization with amine monomers and with acrylonitrile. Calculations and tables.

13924* Solution Viscosity and Molecular Weight of Polystyrene Prepared by Aluminum Chloride Catalysis. D. O. Jordan and A. R. Mathieson. *Journal of Polymer Science*, v. 9, Sept. 1952, p. 286-288.

Viscosities and densities of benzene solutions of 30 different samples of polystyrenes were measured at different concentrations, and number-average molecular weights measured cryoscopically in benzene solution. 10 ref.

13925* Temperature and Frequency Dependence of the Mechanical Behavior of Several High-Polymer Substances. (German.) K. Schmieder and K. Wolf. *Kolloid Zeitschrift*, v. 127, July 1952, p. 65-78.

Describes method, apparatus, and procedure for determining above by means of free torsional vibrations. Effects of temperature on torsion modulus and damping power of high-polymers and plasticized systems are discussed. Illustrations and graphs. 16 ref.

13926* Swelling and Shrinking of Reticulated High-Polymer Substances. (German.) Ernst Jenckel and Gerda Cossmann. *Kolloid Zeitschrift*, v. 127, July 1952, p. 83-97.

The two-phase equilibrium of high polymers was determined at 0-125°C. by determining the temperature of beginning turbidity, isothermal distillation, and mechanical separation of the two phases. Degrees of solubility and swelling properties are shown to depend largely on relative amount of reticulating agent and on type of solvent. Diagrams, graphs, and tables. 15 ref.

13927* Phenolic-Resin Plastics. (German.) Hans Friedrich Müller and Isolde Müller. *Kunststoffe*, v. 42, July 1952, p. 193-199.

The relationships between changes in production and processing and changes in the properties of these resins were investigated. Experimental details are indicated; results are tabulated, charted, and interpreted.

13928* Several Viewpoints on the Preparation and Design of Test Samples of Synthetic Resins for Mechanical Materials Testing. (German.) Karl Frey. *Kunststoffe*, v. 42, Aug. 1952, p. 217-222.

Several examples demonstrate the variety of factors which effect test results and which must be considered in evaluating specifications and standards. Photographs, diagrams, graphs, and references.

13929* Measuring the Surface Resistance of Synthetic Resins. (German.) Cord Peterson. *Kunststoffe*, v. 42, Aug. 1952, p. 223-224.

Describes, diagrams, and illustrates improved device for the above.

13930* Electrostatic Coating of Plastic Surfaces With Flakes. (German.) Erich Escales. *Kunststoffe*, v. 42, Aug. 1952, p. P61-P64.

Describes a method of producing novel effects on plastics by depositing electrostatically charged textile particles (dusts, fibers, etc.) on the adhesive-coated surfaces. Photographs.

13931* Nitrile Rubber as Plasticizer for Polyvinylchloride. (German.) Gerhard Beck. *Kunststoffe*, v. 42, Aug. 1952, p. P64-P66.

Describes tests on the use of mixed polymers of butadiene, acrylonitrile, and styrene as polyvinyl chloride plasticizers. Compositions and physical properties are tabulated.

13932* The Effect of Chemical Constitution on Shape of Polyester Molecules. Fifth Report on Polyesters. (German.) Fritz Wiloth. *Makromolekulare Chemie*, v. 8, July 1952, p. 111-123.

Describes investigation of the shape of molecules of corresponding nonsubstituted and substituted polyesters by two methods. Experimental and theoretical results indicate absence of branching. Graphs and tables. 21 ref.

13933* The Transfer Reaction in Radical Chain Polymerization. (German.) J. W. Breitenbach. *Makromolekulare Chemie*, v. 8, July 1952, p. 147-155.

Besides chain growth and chain termination, chain transfer must also be considered as a possible mechanism of radical chain polymerization. However, the extent and importance of chain transfer for polymerization varies greatly with different compounds. The chain-transfer constant can be calculated from the dependence of average degree of polymerization on concentration of the transfer agent. Some values for the transfer constants of various monomers, initiators, and solvents are presented.

13934 Parts Formed Economically From Thermoplastic Sheet. George Lublin and Maurice Martin. *Materials & Methods*, v. 36, Aug. 1952, p. 92-93.

Describes and illustrates procedures, equipment, and applications of competitor with injection molding.

13935* Progress in Resin Coating. L. M. Burgess and L. E. Swec. *Modern Packaging*, v. 26, Sept. 1952, p. 151-155, 212.

Discusses advances in making coatings for packaging from substantially pure resins applied without solvents or diluents. Article also compares the properties of 6 different hot-melt plastic materials. Tables.

13936 What Silicones Can Do. *Modern Plastics*, v. 30, Sept. 1952, p. 73-80, 184, 187, 188-190.

Describes properties of above together with present and potential uses. Numerous photographs.

13937 Phenolic Duplicating Masters. *Modern Plastics*, v. 30, Sept. 1952, p. 98-99.

Describes quick-curing casting resin which is replacing steel in the production of multi-cavity molds from original models.

28. *Plastics and High Polymers*

13938 Sprayed Metal Molds. Walter Brenner and Leopold Hase. *Modern Plastics*, v. 30, Sept. 1952, p. 105-109, 112, 114, 116.
Describes metal-spray mold-forming process which has been developed to make feasible more economical production of high-quality molds for such diverse industrial applications as plastics sheet forming, slush casting, paint masks, low-pressure laminates, etc.

13939 Effect of Moisture and Fungus on Plastic Insulating Materials. R. K. Witt, J. J. Chapman, and B. L. Raskin. *Modern Plastics*, v. 30, Sept. 1952, p. 119-120, 122, 202-203.
Describes experimental research on the above done in the Plastics Laboratory of the Johns Hopkins University.

13940* Plastics Versus Zinc Die-Casting. *Plastics*, Aug. 1952, p. 219-222.
Two distinct fields in which plastics may replace Zn die-casting are discussed: plastics per se and plastics with electroplating. Cites advantages. Photographs and tables.

13941* Alkyd No. 440. *Plastics Industry*, v. 10, Aug. 1952, p. 6-8.
New fiberous-glass + plastic composition offers excellent insulating properties, high heat resistance, greater impact strength, and easy moldability.

13942* New Developments in Plastic Wood Laminates. George E. Power. *Plastics Industry*, v. 10, Aug. 1952, p. 14-16.
"Stratawood" is combined with impregnated paper, dyes, imported veneers, and glued tubing. "Gaugewood" is now available in large sizes for die stock, and foundry patterns. High market expansion expected.

13943 Teflon Components and Coatings. *Product Engineering*, v. 23, Sept. 1952, p. 149-153.
Describes and illustrates properties of above citing uses as a gasket material and as a protective coating on steel, cast iron, brass, and Cr.

13944 New High Impact Styrenes. *Product Engineering*, v. 23, Sept. 1952, p. 194-196.
Describes above which have been greatly improved in impact strength as compared to products previously developed. Table gives properties of regular and rubber-modified polystyrenes.

13945 Studies in Chain Transfer. II. Catalyzed Polymerization of Methyl Methacrylate. Sadhan Basu, Jyotirindra Nath Sen, and Santi R. Palit. *Proceedings of the Royal Society*, ser. A, v. 214, Aug. 21, 1952, p. 247-262.
Chain-transfer reaction between growing methyl methacrylate polymer radical and toluene when catalyzed by varying quantitites of benzoyl peroxide at 80 and 60°C. and p-nitrobenzoyl peroxide at 80°C. was studied. Also presents equations to reproduce the experimental results. 11 ref.

13946 Polymerization in Liquid Ammonia. Fred Leonard and Paul Fram. *Science*, v. 116, Aug. 29, 1952, p. 228-229.
Suggests that same underlying mechanism may explain the formation of glycollic acid amide and rhodizonic acid, on the one hand; and acrylic acid ester polymer, on the other, by polymerization in liquid NH_3.

13947 Plastic Dies Draw Truck Panels. H. C. Tuttle. *Steel*, v. 131, Sept. 15, 1952, p. 92-93.
Describes application of a standard aircraft-parts procedure to above operation at Chrysler Corp.'s Detroit plant. Advantages cited are: time-saving, lighter weight, and lower cost.

13948* Some Physical Constants of Araldite. (French.) Pierre André. *Vide*, v. 7, May 1952, p. 1200-1202.
The Araldites are made by CIBA of Switzerland. They are ethoxyline resins derived from ethylene oxide. Graphs.

Miscellaneous Publications

13949 Ethoxyline Resins as Cast Resins and Bonding Agents for Metals. Karl Frey. 4th International Mechanical Engineering Congress, June 1952, 13 pages.
Gives examples of above which illustrate the manifold technical possibilities of adopting these resins. Tabulated properties.

13950 Pressed Plastic Parts in the Mechanical Engineering Industry. G. B. v. Hartmann. 4th International Mechanical Engineering Congress, June 1952, 9 pages.
Survey of the rapidly progressing development of thermosetting plastics, on resinous phenol-formaldehyde, to aid in understanding difficulties and problems in general involved in the use of plastics.

13951 Use of Polyamides in Mechanical Constructions Replacing Metals. J. F. Kohlwey. 4th International Mechanical Engineering Congress, June 1952, 12 pages.
Discussion, properties, and illustrated applications for nylon in reference to above.

13952 Importance of Standardization for Working and Application of Plastics. Rudolf Nitsche. 4th International Mechanical Engineering Congress, June 1952, 7 pages.
Discusses plastics standards, especially to aid in use of plastics in the mechanical engineering industries. Considers standards of various countries and classification principles.

13953 Application of Plastics Together With Metals. Richard Vieweg. 4th International Mechanical Engineering Congress, June 1952, 8 pages.
Discusses application-interrelations of metals and plastics especially in regard to development and outlook for the plastics industry. Classification of plastics and comparison of properties of metals, plastics, and glasses.

13954 The Engineering Application of the Absolute Rate Theory to Plastics. II. Filled Plastics. Mervin B. Hogan. Utah Engineering Experiment Station, Bulletin 58, Mar. 1952, 155 pages. (*Bulletin of the University of Utah*, v. 42, no. 10). (TA21 Ut1b)
Published data are analyzed using the Eyring absolute rate theory and a 4-element mechanical model analog applied to the creep of filled plastics. Numerous tables and graphs.

Books

13955 Aminoplastes. (Amine-Type Plastics) Ed. 2. Pierre Talet. 262 pages. 1951. Dunod, Paris. (TP986.A5 T14a2)
After a general outline of the theory of urea-formaldehyde resins and a study of the condensation reaction, this book discusses the applications of amine-type plastics, pointing out their advantages and disadvantages, in order to specify the limits within which they must be used. Chapter bibliographies.

See also:
13051 (plaster + plastics as pattern material)
13741 (plastic gaskets—properties and uses)
13752 (glycerine in resins)
13839 (ion exchange of polyelectrolytes)
13903 (glycol polymers)
13960 (nylon in the rubber industry)
14196 (gravure printing on plastic film)

29. RUBBERS AND OTHER ELASTOMERS

13956 Classifying Butyl Rubber With Respect to Modulus; A Chemical Method. L. L. Currie. *Analytical Chemistry*, v. 24, Aug. 1952, p. 1327-1330.
The stress-strain method of determining the modulus of Butyl rubber possesses severe shortcomings when applied to plant control. A chemical method is described which is less time-consuming and more reproducible. Comprehensive study covered commerical grades of Butyl rubber over an 18-mo. period. Application to plant control is described.

13957* Laws of Uniaxial Compression and Tension in Rubber. (Russian.) G. M. Bartenev. *Doklady Akademii Nauk SSSR*, new ser., v. 84, June 1, 1952, p. 689-692.
Experimental data were used to derive a law of deformation of rubber. Data are charted.

13958* Thermal Depolymerization of Polyisobutylene. (Russian.) V. A. Golubtsova. *Doklady Akademii Nauk SSSR*, new ser., v. 84, June 1, 1952, p. 701-703.
Experimental data on the above are charted, tabulated, and discussed.

13959* The Coagulation of Latex From the Roots of Rubber Bearing Plants. (Russian.) A. A. Prokof'ev and G. P. Safronov. *Doklady Akademii Nauk SSSR*, new ser., v. 84, June 1, 1952, p. 833-836.

Discusses the influence of various factors on the above. Data are tabulated.

13960 Nylon in the Rubber Industry. J. W. Illingworth. *India-Rubber Journal*, v. 123, Aug. 9, 1952, p. 212, 215-218; Aug. 16, 1952, p. 252, 254-258.

Discusses present scope and future possibilities. First part considers especially physical properties, thermal effects, and adhesion. Second part deals with staple fiber, use in tires, other applicatons, and low-stretch nylon. 16 ref.

13961* Latex Stability. E. W. Madge. *Transactions of the Institution of the Rubber Industry*, v. 28, Aug. 1952, p. 207-222; disc., p. 222-223.

Includes survey made of the above with description of tests employed. Graphs and diagrams. 19 ref.

13962 Latex Particle Size Determination Using Diffraction Peaks Obtained With the Point Focusing X-Ray Monochromator. Warren E. Danielson, Leon Shenfil, and Jesse W. M. DuMond. *Journal of Applied Physics*, v. 23, Aug. 1952, p. 860-865.

Results of experiments using above apparatus are described. Experimental data are tabulated from experiments with 3 distinct samples of Dow latex.

13963 Longitudinal and Transverse Ultrasonic Waves in a Synthetic Rubber. A. W. Nolle and P. W. Sieck. *Journal of Applied Physics*, v. 23, Aug. 1952, p. 888-894.

Method involves use of solid transmission media to conduct pulsed signals into a thin flat specimen. Values of bulk modulus and of complex shear modulus are computed from the measurements. Tables.

13964 Electron Microscopy of Synthetic Latices. Samuel H. Maron, Carl Moore, and Allen S. Powell. *Journal of Applied Physics*, v. 23, Aug. 1952, p. 900-905.

Describes micrograph preparation techniques used in study of above and gives some results obtained for 22 synthetic latices of various types.

13965* Stability of the Vulcanized Cross Link in Butyl Rubber: Theory and Application. R. L. Zapp and F. P. Ford. *Journal of Polymer Science*, v. 9, Aug. 1952, p. 97-113.

An illustration of the principle of retarding reversion of Butyl vulcanizates by oxidizing agents is presented. Was demonstrated in the laboratory that service life of automotive tire curing bags made from Butyl can be prolonged by the addition of CaO_2, PbO_2, MnO_2, or SrO_2 to the compound. Graphs and tables. 16 ref.

13966* Mastication of Rubber. I. Mechanism of Plasticizing by Cold Mastication. M. Pike and W. F. Watson. *Journal of Polymer Science*, v. 9, Sept. 1952, p. 229-251.

A mechanism is proposed for the degradation of natural rubber by the cold mastication process. Experimental evidence supporting this mechanism is reported. 47 substances functioning in this way are listed. A more detailed study was carried out with one of these, benzoquinone, varying separately concentration, time of mastication, temperature, and mean chain length of rubber. A similar mechanism is shown to apply to the synthetic rubbers tested. Probable chemical reactions occurring and correlation of cold mastication with other free-radical systems are discussed. The role of oxygen is considered in detail. Possible significance and practical application of the work are suggested. 30 ref.

13967* Spontaneous Decomposition in Vacuum of Natural Rubber Ozonides. C. S. Ramakrishman. *Journal of Scientific & Industrial Research*, v. 11B, June 1952, p. 245-248.

Above was quantitatively studied. Experimental procedure outlined.

13968* Primary Reactions in Rubber. (Concluded.) (German.) Ernst Koldehofe. *Kautschuk und Gummi*, v. 5, Apr. 1952, p. WT55-WT57; May 1952, p. WT76-WT78; June 1952, p. WT92-WT95; July 1952, p. WT107-WT110.

Discussion of primary masticating conditions, effects of moisture, principles of sulfur-free vulcanizing, and enzymatic reactions is supplemented by tables. Concluding article discusses discolorizing reactions, effects of catalysts, cold vulcanization, multiple functions of sulfur, and importance of quebrachitol and its assumed mechanism of action. 20 ref.

13969* The Methodology of Structural Strength Testing. (German.) Ruprecht Ecker. *Kautschuk und Gummi*, July 1952, p. WT97-WT103.

Discusses effect of test conditions on test results for rubber compounds. Typical results are tabulated, charted, and discussed.

13970 Experiments on the Mechanics of Rubber. III. Small Torsions of Stretched Prisms. A. N. Gent and R. S. Bivlin. *Proceedings of the Physical Society*, v. 65, sec. B, Aug. 1, 1952, p. 645-648.

Discusses torsional modulus for small torsions of a rod of incompressible highly elastic material, held in a state of simple extension, to the extension ratio and force necessary to maintain the extension. It is verified experimentally for rods of vulcanized rubber of rectangular cross section. Tables.

13971* Dielectric Study of Pure Gum or Carbon-Black-Loaded Neoprene Mixes. (French.) Lydia Reinisch. *Revue Générale du Caoutchouc*, v. 29, Aug. 1952, p. 593.

Results are charted and discussed.

13972 Trace Elements in Natural and Synthetic Rubbers. Arthur R. Dabald. *Rubber Age*, v. 71, Aug. 1952, p. 621-624.

Discusses the above in reference to cause of major deterioration, oxidation of organic compounds, initiation and propagation reactions, oxidation of diisoprene, influence of trace metals, deactivating harmful trace metals, and role of antioxidants. 15 ref.

13973 Behavior of Neoprene Vibration Isolators at Various Temperatures. Ross E. Morris and Robert R. James. *Rubber Age*, v. 71, Aug. 1952, p. 625-628.

Discusses the above in reference to dynamic stiffness, methods of testing, comparison of measured and natural frequencies, and the effect of temperature on natural frequency and drift. Graphs, diagrams, and tables.

13974* Hardness Tests on Rubber, With Emphasis on Soft Types Such as Foam Rubber and Sponge Rubber. (German.) E. Schiltknecht. *Schweizer Archiv für angewandte Wissenschaft und Technik*, v. 18, July 1952, p. 227-233.

Discusses the importance of hardness tests for rubber. Describes customary types of hardness testers, and a new type. Diagrams, charts, and photographs.

See also:
13741 (rubber gaskets—properties and uses)
13746 (design of rubber springs)
13788 (neoprene latex in paper pulp)
13931 (nitrile rubber as PVC plasticizer)
13944 (rubber—modified styrenes)
14205 (thermoplastic printing plates)
14213 (rubber latex in photography)

30. PAINTS, VARNISHES, LACQUERS, AND ENAMELS

13975 Latex Paint—The Formulation and Manufacture. Edward C. Scholl. *American Paint Journal*, v. 36, Aug. 25, 1952, p. 64-65, 68, 70, 72.

First of 3 articles. Also deals with application and properties.

13976* Polymerization of Drying Oils Under a Vacuum. (Russian.) A. Ia. Korolev and N. I. Leonova. *Doklady Akademii Nauk SSSR*, new ser., v. 85, July 1, 1952, p. 99-102.

Purified linseed oil was used in the experiments. Data are tabulated.

30. *Paints, Varnishes, Lacquers, and Enamels*

13977* Air-Dry Wrinkling Coating Compositions. P. Gopal Sharma and J. S. Aggarwal. *Journal of Scientific and Industrial Research*, v. 11A, July 1952, p. 308-310.

Describes preparation of some of the above compositions from kamala and tung oil.

13978 Pigment Flotation in Paints: a Dynamic Phenomenon. S. H. Bell. *Journal of the Oil & Colour Chemists' Association*, v. 35, Aug. 1952, p. 373-392; disc., p. 392-395.

Discusses nature of above; Bénard cell phenomena; and Bénard and non-Bénard patterns. Photographs, tables, and diagram.

13979 Some Examples of the Statistical Approach to the Planning and Interpretation of Industrial Experiments. B. Saunders. *Journal of the Oil & Colour Chemists' Association*, v. 35, Sept. 1952, p. 448-458.

Describes a comparison made between statistical method of approach and classical method, emphasizing quality and amount of information returned in relation to number of experiments carried out, together with suggestions as to possible use of these and other designs suitable for use in type of experimental work required in paint laboratories.

13980 Oil Absorption Tests for Pigments. J. R. Bainbridge. *Journal of the Oil & Colour Chemists' Association*, v. 35, Sept. 1952, p. 459-473.

Tests to demonstrate the reproducibility of the B.S.S. method for determining oil absorption of pigment were recorded by Marsden. A new statistical analysis of his data leads to conclusions which differ markedly from those recorded by him. Differences are pointed out. Tables.

13981 Paint Types and Tests. *Paint Manufacture*, v. 22, Aug. 1952, p. 289-295, 301.

A review of the B.S. recommended code of practice.

13982 Some Aspects of Sulfurized Linseed Oil and Alkali Resistance of Drying Oil Films. P. Slansky. *Paint, Oil & Chemical Review*, v. 115, Sept. 11, 1952, p. 12, 14, 55-56, 58.

Deals with some observations on the properties and applications of linseed oil treated with sulfur monochloride. The theory underlying the hydrolysis of drying oil films is discussed. 12 ref.

13983 The Reaction Between Styrene and Drying Oils; A Critical Survey of Published Papers. S. Kut. *Paint Technology*, v. 17, Mar. 1952, p. 101-104; Apr. 1952, p. 149-153; May 1952, p. 199-201; June 1952, p. 253-256.

48 references. (To be continued.)

13984 Radioisotopes in Paint Technology. G. G. Manov and Oscar M. Bizzell. *Paint Technology*, v. 17, June 1952, p. 241-251.

Includes elementary explanations of terms, properties of some reactor-produced radioisotopes, and uses in paint industry including transmission gage for measuring thickness of paint films, reflection gage for measuring thickness, determination of wear resistance, mixing of paints, measuring transfer of printing ink, determination of continuity of coating, determining adsorption of paints and waxes, diffusion studies, metal cleaning, permanency of plasticizers, corrosion, role of driers, activation analysis for determining trace impurities, luminous paints, decontamination of protective coatings, and effect of intensive irradiation on protective coatings. Diagrams, photographs and tables. 24 ref.

13985* Lacquer Viscosity Affects Application Properties and Quality of Finish. *Products Finishing*, v. 16, Sept. 1952, p. 80, 82, 84, 86.

Discussion of above based in part on data from Shell Chemical Corp. and Hercules Powder Co.

13986* Lead Soaps and Their Significance in Anti-Corrosive Paints. (German.) Hans Hebberling. *Werkstoffe und Korrosion*, v. 3, Aug. 1952, p. 299-301.

Surveys compositions and properties.

Miscellaneous Publications

13987 Long-Time Performance of Pipeline Coatings. Guy Corfield and C. W. Shupp. American Gas Association, Proceedings, v. 33, 1951, p. 439-447. (TP700 Am35p)

Describes above nonmetallic coatings for underground pipe; explains their success or failure; outlines performance tests and specifications developed to maintain or improve the quality; and discusses present quality control procedures and installation practices. Extensive tabular data.

See also:
13172 (paint coatings for HAE-coated Mg)
13173 (paint coatings for iron and steel)
13177 (chromate base for paints)
13754 (paint coatings for marine corrosion prevention)
13935 (resin coatings for packages)

31. AGRICULTURAL RESEARCH

13988* Residues of Dithiocarbamate Fungicides on Food Crops. C. J. Krister. *Agricultural Chemicals*, v. 7, Sept. 1952, p. 45-48.

Reviews fungicidal properties of the metal salts of dithiocarbamic acid. Describes wide use of 4 derivatives which control a great variety of plant diseases and have low phytotoxicity. Tables.

13989 Detection and Estimation of Steroidal Sapogenins in Plant Tissue. Monroe E. Wall, C. Roland Eddy, Marian L. McClennan, and Mary E. Klumpp. *Analytical Chemistry*, v. 24, Aug. 1952, p. 1337-1341.

Descriptions of procedure by which a large number of plant samples (40-50 by two workers in a 40-hr. week) can be screened rapidly for steroidal sapogenins. Graphs and tables.

13990* Studies on the Nutrition of Pasture Plants in the South-West of Western Australia. IV. The Growth of Subterranean Clover *(Trifolium Subterraneum L.)* as Affected by Lime, Molybdenum, and Potassium. R. C. Rossiter. *Australian Journal of Agricultural Research*, v. 3, July 1952, p. 244-258.

Tables and graphs. 26 ref.

13991* Bioassay of Available Trace Metals From Australian Soils. Catherine Donald, Beverley I. Passey, and R. J. Swaby. *Australian Journal of Agricultural Research*, v. 3, July 1952, p. 305-325.

Reports of a study made of various factors influencing microbiological assay of available Fe, Zn, Cu, Mn, and Mo. *Aspergillus niger* (M.) was chosen as the test organism. Photographs illustrate results. 38 ref.

13992 Five Things You May Not Know About Soil Conditioners. *Chemical Engineering*, v. 59, Aug. 1952, p. 311-312, 314-315.

Deals with what a soil conditioner actually can do, how much conditioner a soil really needs, how a conditioner should be applied, how practical are wet applications, and what differences there are between products.

13993 Alternative Phosphate Fertilizers. Applications to Soils and Crops. Rice Williams. **Current Processes and Possibilities.** T. P. Dee. *Chemistry & Industry*, Aug. 16, 1952, p. 798-803.

Discusses the above on the basis of the literature. 36 ref.

13994* Thiourea As a Stimulant for Germination of Kok-Sagyz and Tau-Sagyz Seeds. (Russian.) A. V. Poptsov. *Doklady Akademii Nauk SSSR*, new ser., v. 84, May 21, 1952, p. 619-622.

Extensive tests at various germination temperatures were made on the above. Data are tabulated and discussed.

13995* The Action of Ultrasonic Vibrations on the Early Phases of Plant Growth. (Russian.) E. L. Ruban and N. N. Dolgopolov. *Doklady Akademii Nauk SSSR*, new ser., v. 84, May 21, 1952, p. 623-626.

Bean, cereal, and olive seeds were subjected to ultrasonic vibrations. Chemical changes and growth characteristics were observed. Data are tabulated.

13996* Increasing the Resistance of Plants to Drought by Preliminary Seed Treatment With Boric Acid Solutions. (Russian.) M. Ia. Shkol'nik, N. A. Makarova, and Iu. E. Plankevich. *Doklady Akademii Nauk SSSR*, new ser., v. 84, June 1, 1952, p. 841-844.

Field tests were made on the above. Data are tabulated.

13997* The Question of the Nature of Intermediate Products of Photosynthesis. (Russian.) N. G. Doman. *Doklady Akademii Nauk SSSR*, new ser., v. 84, June 11, 1952, p. 1017-1020.

A study was made of the above using 2-wk. old bean sprouts. Data are tabulated.

13998* Investigation of the Process of Enzymatic Synthesis and Decomposition of Starch in Potato Tubers With Various Soil Fertilization Methods. (Russian.) A. N. Petrova and T. T. Bolotina. *Doklady Akademii Nauk SSSR*, new ser., v. 84, June 21, 1952, p. 1205-1207.

Field-test results are charted.

13999* The Action of Radioactive Phosphorus Rays On Cell Divsion in the Meristem of Roots. (Russian.) R. G. Trudova. *Doklady Akademii Nauk SSSR*, new ser., v. 85, July 1, 1952, p. 219-220.

An investigation of the above was made as a factor in using P^{32} as a tracer in biological processes. Data are charted and discussed.

14000* Breeding and Establishing New Trees Resistant to Disease. Russel B. Clapper. *Economic Botany*, v. 6, July-Sept. 1952, p. 271-293.

170 references.

14001* Plant Disease Control With Antibiotics. H. W. Anderson and David Gottlieb. *Economic Botany*, v. 6, July-Sept. 1952, p. 294-308.

110 references.

14002* Influence of Chemical Nutrients on the Crop Producing Power of Soil Horizons. J. B. Hester, F. A. Shelton, and R. L. Isaacs, Jr. *Farm Chemicals*, v. 115, Sept. 1952, p. 19-23.

A study designed to ascertain the fundamental deficiencies and the contributions of the various horizons of the soil profile. Tables and photographs. 12 ref.

14003* Phosphorus Accumulation in Soils. M. T. Vittum. *Farm Chemicals*, v. 115, Sept. 1952, p. 39-41, 63.

Depicts recent data with regard to the above and shows the need for revising fertilizing practices. Graphs and tables.

14004 Unicellular Algae as a Possible Source of Food and Chemicals. F. Neville Woodward. *Industrial Chemist and Chemical Manufacturer*, v. 28, Aug. 1952, p. 341-345.

Describes work carried out with *Chlorella*, in an attempt to achieve photosynthesis at near optimum conditions for production of foodstuffs and chemicals. Schematic diagrams. 20 ref.

14005* Fungi Decomposing Jute in Soil Incubation. R. G. Bose. *Journal of Scientific & Industrial Research*, v. 11B, June 1952, p. 250-252.

Four species of *Aspergillus*, one each of *Fusarium*, *Trichoderma viridie*, and *Paecilomyces varioti* were isolated from jute incubated with soil. Of these, 2 *Aspergillus* species and the *Fusarium* species possess marked cellulose decomposing power.

14006* A Reversible Photoreaction Controlling Seed Germination. H. A. Borthwick, S. B. Hendricks, M. W. Parker, E. H. Toole, and Vivian K. Toole. *Proceedings of the National Academy of Sciences*, v. 38, Aug. 1952, p. 662-666.

Effect of light upon germination of some seed is one manifestation of a very general, possibly universal, phenomenon controlling living processes. Some of the details of this effect on lettuce seed are given. Their bearing on the nature of a reversible photoreaction involved is developed.

14007 A Bacterial Growth-Factor Synthesized by a Soil Bacterium. A. G. Lochhead, Margaret O. Burton, and R. H. Thexton. *Nature*, v. 170, Aug. 16, 1952, p. 282.

Brief report of a number of bacteria which were isolated from soil and found to be able to synthesize a factor nutritionally equivalent to soil extract.

14008 Modification of a Soil Percolation Apparatus for Soils of a High Organic Matter Content. T. M. B. Payne and P. H. H. Gray. *Nature*, v. 170, Aug. 23, 1952, p. 325.

Brief description of above apparatus which involves an alteration in the shape of the column containing the soil.

14009 Counting Soil Algae by Direct Fluorescence Microscopy. Y. T. Tchan. *Nature*, v. 170, Aug. 23, 1952, p. 328-329.

Describes a new fluorescence technique to take the place of previous unsatisfactory method for the above.

14010 The Use of Radiocarbon For Tagging Fungi. H. E. Wheeler. *Phytopathology*, v. 42, Aug. 1952, p. 431-435.

Shows that fungal spores and mycelium are tagged effectively by a period of growth on a medium containing radiocarbon in the form of C^{14}-labeled sucrose. These organisms were assayed for radioactivity and their development was followed by autoradiography. Autoradiographs.

14011 The Ascigerous Stage of the Oak Wilt Fungus. T. W. Bretz. *Phytopathology*, v. 42, Aug. 1952, p. 435-437.

Describes experiments of the above. Photomicrographs.

10412 Sexuality in the Oak Wilt Fungus. George H. Hepting, E. Richard Toole, and John S. Boyce, Jr. *Phytopathology*, v. 42, Aug. 1952, p. 438-442.

Shows that through cross-fertilization, with conidia as male cells, the above, as represented by cultures from the southern Appalachian region was found to be hermaphroditic, self-sterile, and interfertile. Methods of preparing media are also given. Tables and macrographs. 15 ref.

14013 The Relation Between Fungitoxicity, Permeation, and Lipid Solubility. Saul Rich and James G. Horsfall. *Phytopathology*, v. 42, Aug. 1952, p. 457-460.

Series of fungitoxic compounds were chosen which should increase in ability to permeate into cells by virtue of increasingly lipophilic side-groupings. Derivatives of 2-imidazoline and of 4-nitrosopyrazole showed increasing fungitoxicity with increasing size of hydrocarbon side group. Tables. 15 ref.

14014* Some New or Unusual Records and Outstanding Features of Plant Disease Development in the United States in 1951. Nellie W. Nance. *Plant Disease Reporter*, Supplement 214, Aug. 15, 1952, p. 142-162.

14015* Critical Remarks Concerning the Validity of the Mitscherlich Effect Law. F. Van Der Paauw. *Plant and Soil*, v. 4, June 1952, p. 97-106.

Some published data on above law pertaining to fertilizer effects were examined. It was found (except in one case) that the law is not confirmed.

14016* Nutritional Studies on Fruit Trees. II. The Relation Between Potassium, Magnesium, and Phosphorus in Apple Leaves. D. Mulder. *Plant and Soil*, v. 4, June 1952, p. 107-117.

Above studies made by using Morgan's colorimetric method and a method for total analysis.

14017* On the Effect of Storage and Temperature on the Exchangeable Manganese in Soil Samples. Else Boken. *Plant and Soil*, v. 4, June 1952, p. 154-163.

Steenbjerg's method was used to determine the above. Tables.

14018* Field Plot Studies With Sawdust for Soil Improvement. Stuart Dunn, L. P. Wolfe, Jr., W. A. MacDonald, and John R. Baker. *Plant and Soil*, v. 4, June 1952, p. 164-170.

Potentialities of rotted sawdust as compared to fresh sawdust and to farm manure in improving poor soil.

14019* Molybdenum Nutrition of Crop Plants. II. Plant and Soil Factors Concerned With Molybdenum Deficiencies in Crop Plants. C. M. Johnson, G. A. Pearson, and P. R. Stout. *Plant and Soil*, v. 4, June 1952, p. 178-196.

Chemical, geological and weathering factors in relation to

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development of the low-available Mo of serpentine soils are discussed. 17 ref.

14020* Absorption and Translocation of Phosphorus by Foliage. W. F. Oliver. *Scientific Agriculture*, v. 32, Aug. 1952, p. 427-432.

Experiments on above on growing corn and bean plants, using a labeled phosphate fertilizer. Diagrams.

14021* A Boron Deficiency in Pear Growing in Soil Having an Adequate Boron Content. C. G. Woodbridge, A. Carney, and H. R. McLarty. *Scientific Agriculture*, v. 32, Aug. 1952, p. 440-442.

Results of analysis of plant tissues and soil are given for above deficiency. 10 ref.

14022* Cation-Exchange Equilibria on Clay Minerals. Erik Eriksson. *Soil Science*, v. 74, Aug. 1952, p. 103-113.

Compares various cation-exchange equations derived by regarding the exchanger + solution phase as a Donnan system with various equations that have been proposed. A theoretical treatment is also given for the case where the exchanger phase consists of, for instance, a comparatively dilute montmorillonite suspension, where the exchangeable ions form a swarm around each particle. Equations, table, and graph. 14 ref.

14023* Some Thermodynamic Properties of Soil Moisture. J. S. Robins. *Soil Science*, v. 74, Aug. 1952, p. 127-139.

An evaluation of specific heat content and specific entropy of soil moisture in addition to specific free energy which makes it possible to draw more definite conclusions concerning the physical and energetic status of soil moisture as well as the mechanism of soil-water retention. Tables. 19 ref.

14024* Effects of 2,4-D and CADE, Singly and in Combination, Upon Nitrate and Bacterial Content of Soils. H. Koike and P. L. Gainey. *Soil Science*, v. 74, Aug. 1952, p. 165-172.

Effects of "Concentrated Activated Diesel Emulsion" and a combination of 2,4-D and CADE, herbicides widely employed in Hawaii, upon nitrate accumulation or total plant counts of bacteria in soil. Tables. 12 ref.

14025* The Suitability of Peat for Granulating Mineral Fertilizers and for Preparation of Organic-Mineral Mixtures. (Russian.) S. N. Ivanov. *Sovetskaia Agronomiia*, v. 10, Jan. 1952, p. 62-68.

Discusses the use of various types of peat for the above and gives data on yields of wheat, barley, and rye with the mixed fertilizers. Data are tabulated.

14026* Characteristics of Guayule on the Bog Lands of Tadzhikstan. (Russian.) V. F. Petrov and B. A. Gramolin. *Sovetskaia Agronomiia*, v. 10, Jan. 1952, p. 83-85.

Describes experiments with guayule in 1951. The plants seem well adapted to the soil and climate of this region.

14027* The Influence of the Ratio of Organic Fertilizer to Superphosphate in Granules and of Size of Granules on Yield of Spring Wheat. (Russian.) A. A. Lyzin. *Sovetskaiia Agronomiia*, v. 10, Mar. 1952, p. 22-24.

Field tests were made in 1950 and 1951 on the above. Data are tabulated.

14028* The Use of Granulated Fertilizers for Early Potatoes. (Russian.) V. M. Motkin and V. P. Illuvieva. *Sovetskaiia Agronomiia*, v. 10, Mar. 1952, p. 25-28.

The use of various mixtures of organic and mineral fertilizers for the above was determined in test fields. Data are tabulated.

14029* Influence of Manure-Phosphate Compost on the Yield of Farm Crops. (Russian.) M. T. Lunin. *Sovetskaia Agronomiia*, v. 10, Apr. 1952, p. 63-65.

Field tests were made using the above fertilizer on sugar beets, rye, and spring wheat. Data are tabulated.

14030* The Value of Fertilizers in Increasing the Yield of Rubber in the Roots of Kok-Sagyz. (Russian.) N. N. Mikhailov. *Sovetskaia Agronomiia*, v. 10, Apr. 1952, p. 66-72.

Field tests were made on the above. Data are tabulated.

14031* The Question of Using *Azotobacter* for Increasing the Yield of Wheat Under Conditions of the Krasnodarskii Region. (Russian.) I. M. Riabchenko and Ia. V. Gubanov. *Sovetskaia Agronomiia*, v. 10, Apr. 1952, p. 73-77.

Field tests were made of the above. Data are tabulated.

14032* Peat Mulch. (Russian.) V. A. Andreev. *Sovetskaia Agronomiia*, v. 10, May 1952, p. 86-88.

Field tests were made on the use of the above with and without mineral fertilizer. Data are tabulated.

14033* An Effective Method in Increasing the Yield of Clover Seed. (Russian.) M. V. Grodskii. *Sovetskaia Agronomiia*, v. 10, May 1952, p. 92.

Briefly discusses the use of boric acid and boric acid plus NPK spray for the above.

14034* The Year-Around Use of Raw Sewage Water for Irrigating Farm Crops. (Russian.) F. S. Marenkin. *Sovetskaia Agronomiia*, v. 10, June 1952, p. 56-59.

Experiments carried on for 2 yrs. on the above are described. Very satisfactory results were obtained.

14035* Aerosols in the Struggle With Warehouse Pests. (Russian.) G. K. Kalbergenov. *Sovetskaia Agronomiia*, v. 10, June 1952, p. 68-71.

Aerosols consisting of DDT or benzene hexachloride and any of several oils were used to destroy insects in warehouses and granaries. Special fog apparatus is described.

14036* Non-Root Feeding of Seed Clover With Boron Fertilizers. (Russian.) V. V. Iakovleva. *Sovetskaia Agronomiia*, v. 10, June 1952, p. 75-77.

Spraying boron solutions on clover, beets, alfalfa, carrots, buckwheat, and other plants grown for seed gave increased yields in all cases. Data are tabulated. 12 ref.

14037* Experiments on the Use of Liquid Fertilizer Under Sugar Beets. (Russian.) K. Sidorenko. *Sovetskaia Agronomiia*, v. 10, June 1952, p. 77-78.

Solutions of fermented manure, superphosphate, and potassium salts were applied underground twice during the growing season. Significant increases of yields were obtained.

14038* Conditions for Preharvest Increase of Rubber in the Roots of Biennial Kok-Sagyz. (Russian.) L. A. Kostoglodov. *Sovetskaia Agronomiia*, v. 10, July 1952, p. 37-41.

Discusses factors in the culture of kok-sagyz such as time of maximum rubber content and ways of increasing the yield.

14039* Non-Root Feeding of Plants. (Russian.) Ia. A. Mednis. *Sovetskaia Agronomiia*, v. 10, July 1952, p. 53-61.

Field tests on the effects of spraying various crops with fertilizer solutions are described. Data are tabulated. 10 ref.

14040* The Characteristics of Soil; A Review of Some Recent Developments. William Ogg. *Times Science Review*, Autumn 1952, p. 12.

Books

14041 Cold Spring Harbor Symposia on Quantitative Biology. Vol. 16. Genes and Mutations. Reginald G. Harris. 521 pages. 1951. Biological Laboratory, Cold Spring Harbor, L. I., N. Y. (QH301 C67s)

Consists of 35 papers classified under the following headings: Theory of the Gene; Cytoplasmic Constituents of Heredity; Evolution of the Gene; Induction of Changes in Genes and Chromosome; Genetic Mechanisms in Bacteria and Bacterial Viruses; and Miscellaneous.

14042 Technics of Plant Histrochemistry and Virology. T. E. Rawlins and William N. Takahashi. 125 pages. 1952. National Press, Millbrae, Calif. (QK861 R19t)

Emphasizes use of polarizing microscope in determining fine structure of cell walls and other cell constituents, and in identification of crystals. Detailed directions for identifying crystalline compounds are given in simplified form. Considerable space is devoted to techniques used in study of viruses causing plant diseases, and, in addition, short sections are included on elementary statistics, use of microscope, photography, and photomicrography.

See also:
13500 (tissue examination by ultraviolet microscopy)
13717 (progress in chemistry of organic natural products)
13770 (industrial utilization of agricultural wastes)
14220 (pesticide requirements for 1953)
14248 (wool replaces bacteria in bactericidal test)

32. PHYSICS

14043* The Phase Transformation Between Super- and Normal Conductors in a Critical Magnetic Field. (German.) F. Beck. *Annalen der Physik*, ser. 6, v. 10, nos. 6-7, 1952, p. 317-326.

Discusses solution of equations of the London-Laue theory for a slow uniform shifting of the boundary between superconducters and normal conductors for the case of an infinite superconducting semi-space. 10 ref.

14044* Increase and Fading of Photoelectric Conductivity of CdS Monocrystals. (German.) J. Fassbender and B. Seraphin. *Annalen der Physik*, ser. 6, v. 10, nos. 6-7, 1952, p. 374-394.

Discusses theory, arrangement, and procedure of measuring above with the oscillograph. Results are quantitatively explained by assuming a recombination mechanism composed of a monomolecular and a bimolecular process. Diagrams, photographs, and graphs. 33 ref.

14045* Luminescence of Organic Oxides in Soluiton. Chemical Structure, and Types of Reactions. (French.) André Bernanose. *Bulletin de la Société Chimique de France*, May-June 1952, p. D39-D42.

Reviews the above on the basis of the literature. Discusses in particular general conditions for chemical luminescence, usable oxidizing reactants, and reactions of luminescent oxides. 69 ref.

14046 Initial Permeability and Related Losses in Ferrites. J. K. Galt. *Ceramic Age*, v. 60, Aug. 1952, p. 29-33.

Importance of the ferrites is related directly to small magnetic losses. Synthesizes present knowledge of the subject into a fairly coherent picture. 26 ref.

14047* Process for Obtaining Absolute Measurements of the Acoustic Strength of the Flow of Ultrasonics in a Liquid, Using Radiation Pressure Acting Upon Liquid-Gas Interfaces. (French.) Charles Florisson. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences*, v. 235, July 7, 1952, p. 27-28.

Describes and diagrams apparatus for the above. An example illustrates results obtainable.

14048* The Behavior of Ions in Strong Electric Fields. (French.) Marcel Pauthenier and René Challande. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences*, v. 235, July 7, 1952, p. 28-30.

Describes experimental apparatus for the above. Table shows mobility of ions with varying voltages. The dependence of the ion mobility upon moisture is indicated.

14049* The Semiconducting Properties of Molybdenite. (French.) Fernande Regnault, Pierre Aigrain, Claude Dugas, and Bernard Jancovici. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences*, v. 235, July 7, 1952, p. 31-32.

The structure and the properties of MoS_2 were studied by measuring its electric conductivity and its Hall effect at temperatures between those of liquid H_2 and 300°C. Results are indicated and interpreted.

14050* Ferrites of Rare Earths With a Double Ferromagnetic Curie Point. (French.) Hubert Forestier and Georges Guiot-Guillain. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences*, v. 235, July 7, 1952, p. 48-50.

While studying a new series of ferrites of rare earths, a new group was found showing two successive ferromagnetic transitions. Proposes an interpretation of the phenomenon. Data are charted.

14051* Semiconductive Properties of Tellurium. (French.) Pierre Aigrain, Claude Dugas, Jacques Legrand des Cloizbeaux, and Bernard Jancovici. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences*, v. 235, July 16, 1952, p. 145-146.

Properties and structure of a semiconducting Te monocrystal were studied by means of electric conductivity and Hall-effect measurements at various temperatures between that of liquid nitrogen and 50°C.

14052* Measuring the Relationship Between Effective Sections of Fission by Thermal Neutrons of Pu-239 and Natural Uranium. (French.) René Cohen, Eugene Cotton, and Antoine Lévêque. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences*, v. 235, July 16, 1952, p. 159-163.

Results of experiments on the above are tabulated and discussed.

14053* The Flow of Real Gases Inside Vertical Tubes. (Russian.) G. A. Adamov. *Doklady Akademii Nauk SSSR*, new ser., v. 84, May 21, 1952, p. 457-460.

Mathematical analysis.

14054* The Temperature Dependence of the Mobility of Current Carriers in Semiconductors. (Russian.) E. D. Deviatkova, Iu. P. Moslakovets, L. S. Stil'bans, and T. S. Stavitskaia. *Doklady Akademii Nauk SSSR*, new ser., v. 84, June 1, 1952, p. 681-682.

The above relationship was found to be logarithmic. Data are charted.

14055* Tmperature-Frequency Dependence of Angle of Dielectric Losses in Crystals of Polar Molecules. (Russian.) K. A. Vodop'ianov. *Doklady Akademii Nauk SSSR*, new ser., v. 84, June 11, 1952, p. 919-921.

Rock salt, talc, and gypsum crystals were used in investigation of the above. Data are charted.

14056* Equations of the Theory of Plasticity in Relationship to Temperature Changes. (Russian.) N. S. Fastov. *Doklady Akademii Nauk SSSR*, new ser., v. 85, July 1, 1952, p. 67-70.

A mathematical discussion.

14057* A Simple Variable Frequency Phase Measuring Device. J. C. West and J. Potts. *Electronic Engineering*, v. 24, Sept. 1952, p. 402-403.

Describes method developed to measure phase shift for use in obtaining steady-state frequency-response loci or Nyquist diagrams of 4-terminal networks. Method was found accurate to ¾°. Diagrams and graphs.

14058* An Apparatus for Determining the Velocity of an Ultrasonic Pulse in Engineering Materials. E. N. Gatfield. *Electronic Engineering*, v. 24, Sept. 1952, p. 390-395.

Details are given of equipment developed at the Road Research Laboratory for the above work, and circuits and mode of operation of each of the units comprising the complete apparatus are described. Circuit diagrams.

14059* Heat Transfer in a Nozzle at Supersonic Speeds. O. A. Saunders and P. H. Calder. *Engineering*, v. 174, Aug. 29, 1952, p. 281-284.

Critically discusses previous work on the above. Describes and diagrams apparatus used in its study. Local heat-transfer coefficient at positions along the divergent section of a convergent-divergent nozzle was determined. Hot combustion gases at 865°C. and a water-cooled nozzle were used; thus, moisture condensation troubles were avoided. Graphs and tables.

14060* An Analysis of Heat Transfer Through Thermal Insulating Materials. E. A. Allcut. *Engineering Journal*, v. 35, Aug. 1952, p. 836-841.

Deals with laboratory tests to determine the relative effectiveness of various methods in the use of insulating materials as barriers to heat transmission. Shows how radiation and convection both influence heat transmission through walls and ceilings insulated with light fibrous materials. Comparative data tabulated and charted.

14061 The Formation of Gas Bubbles From Orifices. Part I. R. W. Jackson. *Industrial Chemist and Chemical Manufacturer*, v. 28, Aug. 1952, p. 346-351.

Critical survey of literature concerning gas-bubble formation.

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This is considered in 3 sections: formation from porous solids, theoretical shapes of 2-phase fluid interfaces, and formation from capillaries. Graphs. (To be continued.)

14062* Studies of Surface Heat Transfer Based on the Boundary Layer Theory. (Japanese) Humio Tamaki. *Report of the Institute of Industrial Science, University of Tokyo,* v. 1, no. 8, Mar. 1952, p. 239-273.

The problem of heat transfer from a body immersed in a fluid flow is studied from the standpoint of boundary layer theory. Effects of pressure gradients and surface temperature in the direction of flow upon character of the thermal boundary layer are investigated by solving the energy equation. 21 ref.

14063 Instrument Electronics. XI. Signal-Shaping Circuits. (Part 2). Milton H. Aronson. *Instruments,* v. 25, Aug. 1952, p. 1088-1089, 1162-1163.

Limiters, clampers, gaters, counters, and phase shifters are discussed in this installment.

14064* Capture of Neutral Particles by Electrified Obstacles. (French.) R. Cochet. *Journal des Recherches du Centre National de la Recherche Scientifique,* June 1952, p. 153-180.

The movement of particles in a liquid near electrically charged obstacles was investigated. Discusses in particular the general equation which determines the movement of a particle at a point in the neighborhood of an electrically charged obstacle, loss of power of high-voltage transmission lines, and evolution of an electrified drop of water in a cloud or mist at positive temperature. Graphs, diagrams, and photographs. 16 ref.

14065* Contribution to the Study of Discharge of Compressible Liquids. (French.) M. Plan. *Journal des Recherches du Centre National de la Recherche Scientifique,* June 1952, p. 187-188.

Describes experiments for visualizing the above. Schlieren photographs.

14066 An Estimate of the Energies of the Positive Ions in a Negative Point-to-Plane Corona. G. L. Wissler and Mark Schindler. *Journal of Applied Physics,* v. 23, Aug. 1952, p. 844-846.

Experimental study of the energies with which positive ions arrive at the point-electrode of a negative point-to-plane corona. A hairpin thermocouple was used as the point electrode.

14067 Single Synthetic Cadmium Sulfide Crystals. S. J. Czyzak, D. J. Craig, and C. E. McCain. *Journal of Applied Physics,* v. 23, Aug. 1952, p. 932-933.

Authors describes in detail method of growing single crystals of CdS. Graphs depicting optical absorption and spectral distribution of photoelectric sensitivity of CdS are drawn.

14068 Influence of Light on the Secondary Emission in a Low Frequency Electrodeless Discharge: Joshi Effect. A. P. Saxena and N. A. Ramaiah. *Journal of Chemical Physics,* v. 20, Aug. 1952, p. 1342.

Reports a few significant observations on instantaneous photovariation in a low-frequency electrodeless discharge in H_2O vapor. 10 ref.

14069 Growth of Zinc Sulfide Single Crystals. Wm. W. Piper. *Journal of Chemical Physics,* v. 20, Aug. 1952, p. 1343.

Brief report of single crystals grown on a quartz wall from the vapor phase. Pure ZnS crystals as well as ones incorporating small amounts of Cu and Mg were grown. Furnace diagram.

14070 Twinning Structure in Crystals of Tungsten Trioxide. R. G. Rhodes. *Nature,* v. 170, Aug. 30, 1952, p. 369.

Microscopic examination of crystals of WO_3 revealed a type of twinning similar to domain patterns characteristic of ferroelectric (tetragonal) phase of $BaTiO_3$.

14071* Basic Problems in Central-Station Nuclear Power. W. H. Zinn. *Nucleonics,* v. 10, Sept. 1952, p. 8-14.

The head of the principal reactor development center places breeding in perspective and gives the first published details of the Experimental Breeder. He says there is no dearth of power-reactor designs and calls for AEC to build one.

14072* Scintillation Counting Techniques. Hartmut Kallmann, Milton Furst, and Miriam Sidran. *Nucleonics,* v. 10, Sept. 1952, p. 15-17.

Merits of the counting, integrated intensity, and storage methods for obtaining dose and dose rate of high-energy radiation are discussed. Intensities of 10^{-6}r./hr. can be measured by the first 2 methods; the 3rd can indicate as little as 10^{-2}r. even after a considerable lapse of time.

14073* Evaluation of Food Sterilization Efficiency. S. A. Goldblith and B. E. Proctor. *Nucleonics,* v. 10, Sept. 1952, p. 28-29.

Tells how, if absorber and equipment characteristics are known, optimum conditions can be determined for irradiation of foods with high-energy cathode rays. Graphs.

14074* Pulse-Amplitude Analysis in Nuclear Research. Part III. Multichannel Analyzers. A. B. Van Rennes. *Nucleonics,* v. 10, Sept. 1952, p. 32-38.

Describes and diagrams analyzers in which pulse-height selection is accomplished by mechanical means, thermionic diodes, trigger circuits, a sorting-ladder circuit, and by beam-deflection techniques. 10 ref.

14075* Liquid Scintillation Beta Counter for Radioactive Solids. Otto Blüh and Fred Terentiuk. *Nucleonics,* v. 10, Sept. 1952, p. 48-51.

Less than 10^{-3} microcurie has been measured in counter described and illustrated. It permits use of larger-than-usual samples. A wide variety of solid materials can be accommodated for both multiple-sample and volume counting.

14076 Transition Probabilities in Sharp and Diffuse Series of Potassium. D. S. Villars. *Journal of the Optical Society of America,* v. 42, Aug. 1952, p. 552-558.

The IBM Card Programmed Calculator was wired to compute wave functions of several terms of the sharp and diffuse series of K (up to 11s and 9d). Transition probabilities and "oscillator" and "line strengths" estimated from these are reported. The computational procedure employed was that developed by Biermann and Lübeck. Reliability of the results is discussed. 10 ref.

14077 Gamma-Ray Absorption Measurements. Stirling A. Colgate. *Physical Review,* v. 87, Aug. 15, 1952, p. 592-601.

Above were made using a NaI energy selective scintillation counter with radioactive source gamma-rays of 0.411, 0.664, 1.33, and 2.62 Mev energy. A range of absorbers from hydrogen to uranium was used and comparison of theory to experiment is presented.

14078 Spectral Dependence of Thermionic Emission With Activation From (Ba-Sr)O Cathodes Over the Visible Region. Tadatosi Hibi and Kazuo Ishikawa. *Physical Review,* v. 87, Aug. 15, 1952, p. 673-674.

Describes experiments to investigate the above. Graphs.

14079 Generation of Color Center Precursors in Alkali Halides by Electrolysis. Michael Hacskaylo and Gerhart Groetzinger. *Physical Review,* ser. 2, v. 87, Sept. 1, 1952, p. 789-795.

Properties of crystals containing precursors and of those containing color centers derived from precursors were studied and compared with those of crystals in other previously known states. A proposal regarding nature of second type of precursor is presented.

14080 Statistics of the Recombinations of Holes and Electrons. W. Shockley and W. T. Read, Jr. *Physical Review,* ser. 2, v. 87, Sept. 1, 1952, p. 835-842.

The above in semiconductors is analyzed on basis of a model in which recombination occurs through mechanism of trapping. Dependence of litfetime of injected carriers upon initial conductivity and upon injected carrier density is discussed.

14081 Electrical and Optical Properties of Rutile Single Crystals. D. C. Cronemeyer. *Physical Review,* ser. 2, v. 87, Sept. 1, 1952, p. 876-886.

Presents methods, apparatus, and experimental data in reference to the above. Diagrams and graphs.

14082* Some Post-War Developments in Magnetism. L. F. Bates. *Proceedings of the Physical Society*, v. 65, sec. A, Aug. 1, 1952, p. 577-594.

A survey. 18 ref.

14083* A Note on the Theory of Semiconductors. P. T. Landsberg. *Proceedings of the Physical Society*, v. 65, sec. A, Aug. 1, 1952, p. 604-608.

One obtains two different theories of semiconductors, depending on whether the free energy due to the spin of electrons in donor (or acceptor) centers is taken into account. It is shown that the former approach can be carried through for a degenerate semiconductor, that it applies formally to the case when the interaction between impurity centers and conduction electrons is taken into account, provided one of the symbols is reinterpreted, and that it is to be preferred. The 2nd approach has, however, been used almost universally. Its deficiencies are proven. 11 ref.

14084 Analysis of Polarized Light Reflected from Absorbing Materials at Normal Incidence. J. Woodwrow, B. W. Mott, and H. R. Haines. *Proceedings of the Physical Society*, v. 65, sec. B, Aug. 1, 1952, p. 603-616.

Discusses expressions derived for intensity of analyzed light reflected from absorbing crystals under crossed polarizing units and with the analyzer slightly rotated from the crossed position. Relationships are illustrated by experimental curves on specimens of Sn, U, Bi, and stibnite. Graphs. 13 ref.

14085 Sparking Potentials in a Transverse Magnetic Field. J. M. Somerville. *Proceedings of the Physical Society*, v. 65, sec. B, Aug. 1, 1952, p. 620-629.

Valle's theory of sparking between parallel plates in a transverse magnetic field is shown to be in qualitative disagreement with observation. By allowing for distribution of electron free paths, and for electron recapture by cathode, a modified theory is produced. Graphs.

14086* Certain Non-Steady Flows of Liquids and Gases in Porous Media. (Russian.) G. I. Barenblatt. *Prikladnaia Matematika i Mekhanika*, v. 16, Jan.-Feb. 1952, p. 67-78.

14087* Elasto-Plastic Equilibrium of a Wedge and Its Discontinuous Solution in the Theory of Plasticity. (Russian.) G. S. Shapiro. *Prikladnaia Matematika i Mekhanika*, v. 16, Jan.-Feb. 1952, p. 101-106.

11 references.

14088* The Impact of Plane Gas Flow Against an Infinite Wall. (Russian.) N. A. Slezkin. *Prikladnaia Matematika i Mekhanika*, v. 16, Mar.-Apr. 1952, p. 227-230.

Presents a mathematical treatment of the above using hydrodynamic principles.

14089* On Waves of Finite Amplitude in Ducts. Part. I. Wave Fronts. Part II. Waves of Moderate Amplitude. R. E. Meyer. *Quarterly Journal of Mechanics and Applied Mathematics*, v. 5, Sept. 1952, p. 257-291.

Part I deals with the shock-free flow of an inviscid, perfect gas in a duct of varying cross-section. Part II extends part I to first-order theory of advancing and receding waves. Includes spherical waves and waves with cylindrical symmetry. Equations and diagrams.

14090* Supersonic Theory of Downwash Fields. D. C. M. Leslie. *Quarterly Journal of Mechanics and Applied Mathematics*, v. 5, Sept. 1952, p. 292-300.

Presents introductory summary of Lagerstrom's, Mirels and Haefeli's, and Robinson and Hunter-Tod's theories. Shows that the basic formula of Robinson and Hunter-Tod giving the downwash in terms of flow on wing, can be deduced very rapidly from Hadamard's theorem. When flow is conical, this equation can be shown to be identical with that of Lagerstrom. Also, this formula makes clear the nature of the approximation made by Mirels and Haefeli. Diagrams.

14091* Some Unsteady Motions of a Slender Body Through an Inviscid Gas. J. E. Phythian. *Quarterly Journal of Mechanics and Applied Mathematics*, v. 5, Sept. 1952, p. 301-317.

Effects of variations in forward velocity and in angle of incidence are investigated on a linearized theory, and results are established for slender bodies both of revolution and of general cross-section.

14092* The Energy Distribution Behind a Decaying Two-Dimensional Shock. J. E. Phythian. *Quarterly Journal of Mechanics and Applied Mathematics*, v. 5, Sept. 1952, p. 318-323.

Work of Lighthill for 1-dimensional unsteady motion is extended to problems of steady, supersonic flow past a 2-dimensional slender body. Work includes problem of actual flow past a 2-dimensional aerofoil when there are 2 shocks forming an N wave. Conditions very far downstream are investigated.

14093* The Induction of Electric Currents in a Uniformly Conducting Circular Disk by the Sudden Creation of Magnetic Poles. A. A. Ashour. *Quarterly Journal of Mechanics and Applied Mathematics*, v. 5, Sept. 1952, p. 379-384.

Shows that by using torodial coordinates, a double space of 2 regions is constructed in the manner of Sommerfeld's theory. The Riemann potential for a single pole is obtained and Jean's treatment of uniform finite plane current sheets is applied to the case of the circular disk.

14094* Industrial Applications of Semi-Conductors. 6. Semi-Conductor Thermopiles. E. Schwarz. *Research*, v. 5, Sept. 1952, p. 407-411.

A short and qualitative outline of the theory of thermopiles is given. Also includes properties and applications of semiconductors.

14095 The Phoswich—A Multiple Phosphor. D. H. Wilkinson. *Review of Scientific Instruments*, v. 23, Aug. 1952, p. 414-417.

Describes above which combines fast and slow phosphors with a single photomultiplier. This makes possible construction of highly directional phosphors, phosphors responding only to neutral radiations, and phosphors free of wall effects. Transparency of NaI(Tl) and stilbene to each other's radiations is demonstrated.

14096 On Plastic Scintillation Phosphors. Robert M. Kloepper and M. L. Wiedenbeck. *Review of Scientific Instruments*, v. 23, Aug. 1952, p. 446-447.

Describes method used to produce various plastic phosphors: solid solutions of 5% p-terphenyl, 10% stilbene, or 5% anthracene in polystyrene.

14097* The Conversion of Impaired Radiation Into Visible Light. (French.) Georges Déjardin. *Revue générale des Sciences pures et appliqueés et Bulletin de la Société philomatique*, v. 59, nos. 5-6, 1952, p. 148-162.

Presents a general review of investigations on the above during the past 100 years and outlines the author's own research work and results and conclusions. Includes graphs, schematic drawings, and photographs of various spectra studies.

14098* Definition of Diffusor Operational Efficiency. (German.) W. Bader. *Technik*, v. 7, Feb. 1952, p. 77-80.

Points out that the mechanical meaning of above as applied to incompressible liquids differs from the concept of adiabatic efficiency used in the theory of compressors; also shows that an efficiency factor for compressible media can be transferred to inelastic liquids by means of simple approximation formulas. Graphs.

14099 Dielectric and Semiconductive Suspensions. Hans E. Hollman. *Tele-Tech*, v. 11, Sept. 1952, p. 56-57, 135-136, 138, 140, 142.

Analysis of the fibration of ferromagnetic and dielectric colloids in design of magnetic and electric clutches. Semiconductive fibers when "frozen" permit formation of "Polaristors", nonlinear resistors.

14100* Exact Solutions of the Stokes-Navier Equations of Incompressible Liquids Under Modified Boundary Conditions. (German.) Jakob Ackeret. *Zeitschrift für angewandte Mathematik und Physik*, v. 3, July 15, 1952, p. 259-271.

14101* Discrete Energy Losses of 35-keV Electrons Upon Interaction With Atoms and Molecules. (German.) G. Möl-

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lenstedt. *Zeitschrift für Naturforschung*, v. 7a, July 1952, p. 465-470.

An electrostatic velocity analyzer of high resolution was used to measure release of energy by rapid electrons (35-50keV.) to atoms and molecules of N_2, O_2, H_2, He_2, C_6H_6, CO_2, H_2O, $C_6H_4(CH_3)_2$, and $C_2H_5OC_2H_5$. Results prove the accuracy of the analyzer. Diagrams, tables, and photographs. 14 ref.

14102* A New Method of Concentrating Isotopes in the Transition Range Between Knudsen and Poiseville Flow. (German.) H. D. Beckey and W. E. Groth. *Zeitschrift für Naturforschung*, v. 7a, July 1952, p. 474-480.

Apparatus is described and diagrammed. Results are charted and discussed. Mathematical basis is presented.

14103* Experimental Research on the Ranque Turbulence Tube. (German.) Karlheinz Schmidt. *Zeitschrift für Naturforschung*, v. 7a, July 1952, p. 480-486.

Describes experimental and mathematical studies of the cooling-heating effect of compressed air entering a tube at a tangent to the inside wall. Such an arrangement is also known as a Hilsch tube. Diagrams and graphs.

14104* The Fading of Calcium Tungstate and Zinc Oxide Phosphors During Electron-Beam Excitation. (German.) H. Gobrecht, Dietrich Hahn, and H. Dammann. *Zeitschrift für Physik*, v. 132, no. 3, 1952, p. 239-247.

Describes equipment and procedure for recording the above by an oscillographic method. Results are compared with published properties of these phosphors. Diagrams, oscillograms, and graphs. 12 ref.

14105* High-Frequency Behavior of Boundary-Layer Rectifiers. (German.) W. Schottky. *Zeitschrift für Physik*, v. 132, no. 3, 1952, p. 261-284.

Discusses at length the statement that in above rectifiers with uni-directional perturbation-center semiconduction, a retardation in the reaction equilibrium between locally fixed perturbation centers and released types of electrons can become noticeable in the impedance and rectifier behavior only when most of the perturbation centers in the interior of the semiconductor remain undissociated. 18 ref.

14106* Electronic Conduction in Crystalline Insulators. (German.) Walter Franz. *Zeitschrift für Physik*, v. 132, no. 3, 1952, p. 285-311.

Develops the principles of a theory of the sterically homogeneous electronic conduction in high electrical fields and of electronic flash-over in insulating crystals. Impulse ionization and recombination are considered in determination of distribution function of conduction electrons to the different energies. Diagrams and graphs. 15 ref.

14107* Research on the Heat Conductivity of Electrets. (German.) Jan Van Calker and Richard Arnold. *Zeitschrift für Physik*, v. 132, no. 3, 1952, p. 318-329.

Effect of electrical field on heat conductivities of electrets is shown to be due to the presence of water. Diagrams, graphs, tabulated data, and 9 references.

14108* Photoelectric Conductivity of Zinc Oxide. (German.) H. Weiss. *Zeitschrift für Physik*, v. 132, no. 3, 1952, p. 335-353.

Experimental study of above with thin vapor-deposited ZnO films as a function of wave length of incident light and temperature is described and illustrated; results are tabulated and charted. 15 ref.

14109* Conductivity Changes of Thin Zinc-Oxide Films, Caused by Irradiation With Electrons. Energy Conversion From the Irradiation of Zinc-Oxide Films With Light or Electrons. (German.) G. Heiland. *Zeitschrift für Physik*, v. 132, no. 3, 1952, p. 354-366; 367-383.

In first of these articles, irradiation with electrons (1-6 KV. energy) is shown to increase the conductivity of ZnO. The second article presents a theoretical explanation of the experimental results. Diagrams and graphs. 40 ref.

14110* Dielectric Investigations of Ferrites. (German.) Gottfried Möltgen. *Zeitschrift für angewandte Physik*, v. 4, June 1952, p. 216-224.

Describes measurement of dielectric properties of 40 ferrite samples. Results indicate that they have the dielectric properties of a substance with inhomogeneous structure. Tables, graphs, diagrams, and references.

14111* Superconductivity of Columbium Nitride. (German. H. Rögener. *Zeitschrift für Physik*, v. 132, no. 4, July 1952, p. 446-467.

Describes procedure of preparing CbN and determining its superconductivity under different conditions. Diagrams, tables, graphs, and photographs.

14112* High Concentration of Perturbance Centers in Alkali Halides. (German.) Rudolf Kaiser. *Zeitschrift für Physik*, v. 132, no. 4, July 1952, p. 482-496.

Discusses production and study of alkali halide crystals vapor-deposited with an excess of metal. Preparation of the halides is described and results indicate that the required high energy of ionization prevents heavy metals from releasing electrons to the halide-ion gaps. Diagrams and graphs. 20 ref.

14113* A New Type of Light Absorption in Silver Halides. (German.) Wolfgang Kaiser. *Zeitschrift für Physik*, v. 132, no. 4, July 1952, p. 497-507.

Describes preparation of samples and measurement of light-wave absorption of AgCl films with excess Ag, Cu, or Au. Results are graphed. 24 ref.

Miscellaneous Publications

14114 The Theoretical Characteristics of Triangular-Tip Control Surfaces at Supersonic Speeds, Mach Lines Behind Trailing Edges. Julian H. Kainer and Mary Dowd King. National Advisory Committee for Aeronautics, Technical Note 2715, July 1952, 76 pages. (TL570 Un3t)

By means of linearized theory, generalized expressions in closed form were obtained for characteristics due to control-surface deflection and to wing angle of attack for above wing-plan forms. Charts are presented for deflection characteristics for configurations having the sweep of the wing and control-surface trailing edges equal and for location of the hinge line for balanced controls. Tables of calculations are given for configurations in which wing and flap trailing edges are unequally swept. Equations, diagrams, graphs, and tables. 21 ref.

14115 A Study of the Stability of the Laminar Boundary Layer as Affected by Changes in the Boundary-Layer Thickness in Regions of Pressure Gradient and Flow Through the Surface. Neal Tetervin and David A. Levine. National Advisory Committee for Aeronautics, Technical Note 2752, Aug. 1952, 83 pages. (TL570 Un3t)

19 references.

14116 A Method of Selecting the Thickness, Hollowness, and Size of a Supersonic Wing for Least Drag and Sufficient Bending Strength at Specified Flight Conditions. James L. Amick. National Advisory Committee for Aeronautics, Technical Note 2754, July 1952, 38 pages. (TL570 Un3t)

Analytical method is presented by means of which optimum wing dimensions can readily be obtained. An example of application of the method to a diamond wing at Mach number 2.0, for a range of specified flight conditions, is presented. For supersonic flight at low altitudes, steel wings appear to have appreciably less drag than aluminum wings; whereas, for high altitudes, the reverse appears to be true. Equations, graphs, and diagrams.

14117 Accuracy of Approximate Methods for Predicting Pressures on Pointed Nonlifting Bodies of Revolution in Supersonic Flow. Dorris M. Ehret. National Advisory Committee for Aeronautics, Technical Note 2764, Aug. 1952, 26 pages. (TL570 Un3t)

Accuracy and range of applicability of linearized theory, second-order theory, tangent-cone method, conical-shock-expansion theory, and Newtonian theory for predicting above were investigated. Pressure distributions and integrated pressure drag obtained by these methods are compared with standard values obtained by the method of characteristics and the theory of Taylor and Maccoll. Three shapes, cone, ogive, and a modified

optimum body, were investigated over a wide range of fineness ratios and Mach numbers. Graphs and tables.

14118 Supersonic Flow With Whirl and Vorticity in Axisymmetric Channels. Ralph J. Eschborn. National Advisory Committee for Aeronautics, Technical Note 2768, Aug. 1952, 41 pages. (TL570 Un3t)

Axially symmetric supersonic steady flow is treated for a nonviscous fluid flowing with whirl component between 2 arbitrary coaxial surfaces of revolution. Solution of supersonic characteristic equations is investigated for arbitrary axisymmetric flow fields with and without vorticity.

14119 Asymptotic Solutions for the Straight Ahead Transport Equation. J. Ernest Wilkins, Jr., Alan Oppenheim, and Stanley Preiser. Atomic Energy Commission, NYO-639, Oct. 15, 1951, 51 pages. (UF767 U3ny)

Asymptotic expansions of the solutions for the straight-ahead transport equation are derived, when the scattering kernel is separable and total cross section is either monotonic, parabolic, or arbitrary with an absolute minimum. Answers for monotonic and parabolic total cross section are generalizations and extensions of results given by Fano, Welton, and Hurwitz for specific kernels. In addition, asymptotic expansion for an arbitrary kernel and constant total cross section is derived. A few numerical examples are discussed and some of them are compared with answers obtained from Greulin-type solutions of the straight ahead transport equation reported in NYO-633, 634, and 635.

Books

14120 Lehrbuch der Chemischen Physik. Band I. Die Korpuskularen Bausteine der Materie. Band II. Makrozustände der Materie. Tielband I. Allgemeine Grundlagen. Gase. Teilband II. Kondensierte Phasen und Heterogene Systeme. (Textbook of Chemical Physics. Vol. I. The Corpuscular Elements of Matter. Vol. II. The Macro Constituents of Matter. Part I. General Principles; Gases. Part II. Condensed Phases and Heterogeneous Systems.) Ed. 3. Arnold Eucken. 730 and 1538 pages. 1949 and 1950. Akademische Verlags-Gesellschaft Geest und Portig K. G., Leipzig, Germany. (QD453 Eu22L3)

Vol. I deals with the corpuscular theory of matter; experimental methods of determining the properties of individual particles, their properties from the standpoint of wave mechanics; and structure and properties of atoms, molecules, and atomic nuclei. Vol. II, Part I, covers the principles of thermodynamics; statistical and kinetic theory of matter; and gases; and Part 2, crystallized solids, liquids, and boundary-layer phenomena. Diagrams, graphs, tables, photographs, and numerous references.

14121 A Bibliographical Survey of Flow Through Orifices and Parallel-Throated Nozzles. T. H. Redding. 196 pages. 1952. Chapman & Hall, Ltd., London. (Z5853.H9 R24b)

Also contains technical introduction and an appendix defining some 92 terms used in flow-metering practice. Covers the literature from the year 1832, and is classified by subjects. Abstracts are given in all cases.

14122 Advanced Dynamics. Vol. I. Dynamics of a Particle. Vol. II. Dynamics of a Solid Body. E. Howard Smart. 419 and 420 pages. 1951. Macmillan and Co., London. (QA845 Gm28a)

Vol. I deals with rectilinear motion with acceleration towards and away from a fixed point; oscillating particles; simple harmonic motion with unresisted and damped vibration; and impulsive forces applied to problems of impact. Vol. II deals with d'Alembert's principle and equations of motion in 2 and 3 dimensions; Lagrange's equations and generalized coordinates; the motion of a top; and Hamilton's equations and general theorems on impulses.

See also:

13247 (conductivity of Si)
13491 (nuclear radiation shielding)
13604 (magnetic studies of carbon and graphite)
13695 (magnetic ceramics)
13714 (development of ferromagnetic ferrites)
14130 (physics of transistors)
14192 (solid-state physics research at MIT)
14235 (dielectric behavior of water and blood)
14263 (papers of James Clark Maxwell)

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14123* A Transformer for Measuring the Mechanical Output, the Torsion Moment, and the Number of Turns in the Region of Larger Numbers of Turns. (German.) Wilfried Oesterlin. *Archiv für technisches Messen*, July 1952, p. 147-150.

Describes a new transformer. Its structure and operation are diagrammed. Zero-point investigations and errors are discussed. 11 ref.

14124* Frequency Stabilization in the Microwave Region. (German.) Bernhard Koch. *Archiv für technisches Messen*, July 1952, p. 155-158.

Describes various types of frequency stabilization on the basis of the literature. Construction details and their theoretical basis are indicated.

14125* Tube Amplifier for Direct Current Voltage. I. Potentials and Interference Voltages. (German.) G. Kebler. *Archiv für technisches Messen*, July 1952, p. 163-166.

Discusses problems in the technology for the above, such as frequency band, potentials, and interference voltage. Special solutions for these problems are proposed and diagrammed.

14126* Measurement of Resistances Above 10^{12} Ohm. I. Basis. Galvanometric Measuring Process. (German.) Karl Heinz Winterling. *Archiv für Technisches Messen*, Aug. 1952, p. 171-174.

Describes methods for measuring such high resistances, characterized by charging and discharging processes, and dependent upon the time element. Discusses resistance and conductance of insulators, theoretical limit of measurement, and galvanometric measuring methods. 12 ref.

14127* Magnetic Field Measurement With an Iron-Core Magnetometer According to a Harmonic Process. (German.) Rudolf Kühne. *Archiv für Technisches Messen*, Aug. 1952, p. 175-178.

Discusses the principle and its practical application, on the basis of the literature. 28 ref.

14128* Magnetic Audio Frequency Fundamentals. (German.) A. M. Vincent. *Audio Engineering*, v. 36, Sept. 1952, p. 42, 44, 46, 73.

Brief history of magnetic amplifier development with preliminary description of operating principles. Comparison of electron-tube amplifiers and magnetic amplifiers. Basic circuits. Advantages and disadvantages with respect to conventional tube amplifiers. Future development.

14129 Electronic Computor Mechanisms For U. S. Air Force. Joseph Geschelin. *Automotive Industries*, v. 106, May 1, 1952, p. 54-56, 78.

Management and production problems and their solutions. High spots some noteworthy precision operations.

14130* The Physics of Transistors. E. Billig. *British Journal of Applied Physics*, v. 3, Aug. 1952, p. 241-248.

Some of the fundamental concepts of the solid state which are required for an understanding of transistor action are discussed and results of wave mechanics when applied to the solid state are outlined. Diagrams.

14131* Calculation of the Leakage Flux of the Pendent-Armature Relay. J. W. Cohen and H. Grosser. *Communication News*, v. 12, June 1952, p. 125-131.

A solution is found by an iteration process which gives an approximation adequate for practical requirements. To solve the problem by means of difference-calculation Southwell's relaxation method was applied to calculation of magnetic field. From this, magnetic conductivity of the space between the core and the yoke was determined.

14132* New Oscillating Tubes With a Broad Band Pass for High Frequencies. (French.) Pierre Guénard, Oskar Doehler, Bernard Epsztein, and Robert Warnecke. *Comptes*

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Rendus hebdomadaires des Séances de l'Académie des Sciences, v. 235, July 21, 1952, p. 236-238.

Discusses fundamental principles underlying above tubes. Includes schematic diagrams.

14133* Statistical Theory of Magnetrons (Static Region). (Russian.) G. Ia. Liubarskii and L. E. Pargamnik. *Doklady Akademii Nauk SSSR*, new ser., v. 84, May 21, 1952, p. 491-494.

A mathematical analysis.

14134* Methodology of Recording of High-Voltage Discharges. (Russian.) I. S. Stekol'nikov. *Doklady Akademii Nauk SSSR*, new ser., v. 84, June 21, 1952, p. 1163-1166.

Apparatus is shown schematically. Oscillograms are illustrated and charted.

14135* Electric Power Systems and Nuclear Power. Walker L. Cisler. *Edison Electric Institute Bulletin*, v. 20, Sept. 1952, p. 289-293, 317.

Discusses joint project of Dow Chemical Co. and Detroit Edison Co. for studying feasibility of utilizing heat from nuclear fission for electric-power systems. Diagrams, graphs, and tables.

14136* Determination of Electron Density and Collision Frequency in a Gaseous Discharge by Microwave Propagation Measurements. Ladislas Goldstein, M. A. Lampert, and R. H. Geiger. *Electrical Communication*, v. 29, Sept. 1952, p. 243-245.

Gives details of calculations and experimental methods. Typical data are tabulated.

14137* Moneca—A New Network Calculator for Motor Performance Calculations. C. G. Veinott. *Electrical Engineering*, v. 71, Sept. 1952, p. 795-801.

Describes above which is based on a new revolving field equivalent circuit thus shortening time for making calculations for single-phase induction motors. Circuit diagrams, graphs, and tables.

14138* Electrification of Holland's Railway System. A. H. Candee. *Electrical Engineering*, v. 71, Sept. 1952, p. 806-812.

Gives details of above which was electrified with a 1500-volt d.c. system. Photographs and tables.

14139* Subminiature Electron Tubes are Reliable. E. B. Steinberg and Frank J. Oliver. *Electrical Manufacturing*, v. 50, Sept. 1952, p. 84-89, 278, 280, 282, 284.

Description of the above in reference to specifications, advantages, and disadvantages. Diagrams and photographs.

14140* Effects of Moisture and Mildew on Electronic Equipment. John M. Leonard. *Electrical Manufacturing*, v. 50, Sept. 1952, p. 98-103, 316, 318, 320.

Certain treatments are re-appraised in the light of new studies of the subject, including field tests at the Navy's Canal Zone tropical test station. Photographs and graphs.

14141* Embedded Selenium Rectifiers. B. Parsons and A. M. D'Urso. *Electrical Manufacturing*, v. 50, Sept. 1952, p. 134, 232.

Points out that the above reduce space, weight, and cost; and improve vibration and corrosion resistance. Three types of construction are compared.

14142 Positive-Plate Self-Discharge in the Lead-Acid Cell. John J. Lander. *Journal of the Electrochemical Society*, v. 99, Sept. 1952, p. 339-342.

Results of experimental information which shows the primary cause of self-discharge at positive plates with antimonial grids.

14142A An Electrochemical Evaluation of Manganese Dioxide for Dry Battery Use. N. C. Cahoon. *Journal of the Electrochemical Society*, v. 99, Sept. 1952, p. 343-348.

Description of 2 tests: determination of the pH-potential relation in Zn and NH_4Cl electrolyte and determination of the "utilization factor", i.e., extent of cathodic reduction in a continuous stream of fresh electrolyte. These tests correlate physical and chemical properties of MnO_2. 11 ref.

14143 Anniversary Issue on Storage Batteries. J. C. White. *Journal of the Electrochemical Society*, v. 99, Sept. 1952, p. 233C-254C.

Includes an introduction by J. C. White, and the following papers: "The Lead-Acid Automobile Battery", E. Willihnganz; "Lead-Acid Motive Power and Carlighting Batteries", H. C. Riggs; "Lead-Acid Stationary Batteries", Upton B. Thomas; "Plastic Container-Electrolyte Retaining Lead-Acid Storage Batteries", C. H. Endress and C. C. Rose; "Low Discharge Cells", C. C. Rose and A. C. Zachlin; "The Edison Nickel-Iron-Alkaline Cell", Fayette C. Anderson; "Nickel-Cadmium Batteries—Pocket Type", Sven Bergstrom; "Sintered Plate Nickel-Cadmium Batteries", G. B. Ellis, H. Mandel, and D. Linden; and "The Zinc-Silver Peroxide Alkaline Storage Battery", Samuel Eidensohn.

14144* A Study of the Characteristics of Glow-Discharge Voltage-Regulator Tubes. F. A. Benson. *Electronic Engineering*, v. 24, Sept. 1952, p. 396-401.

Suitability of above tubes for use in precision electronic circuits was investigated. Work included detailed studies of variations in striking and running voltages for both short and long-term operation, steps and hysteresis, effects of temperature, current overloads, vibration, stray magnetic fields, and storage. Graphs and tables. (To be continued.) 15 ref.

14145* The Differential Amplifier With a Useful Modification. B. F. Davies. *Electronic Engineering*, v. 24, Sept. 1952, p. 404-407.

A short theoretical analysis of the double-triode circuit is given to show capabilities of the circuit under actual working conditions. Graphs and circuit diagrams.

14146* A New Frequency Divider. J. A. Fitzgerald. *Electronic Engineering*, v. 24, Sept. 1952, p. 413-415.

Describes a frequency divider which is a development of the balanced-modulator type of divider and which is intended to incorporate requirements of reliability, stability of operation, ease of alignment, simplicity of construction, and compactness of design.

14147* Special Rectifier Circuits. D. B. Corbyn. *Electronic Engineering*, v. 24, Sept. 1952, p. 418-419.

Some rectifier circuits are described which are suitable for producing high voltages but with better regulation and less ripple voltage than conventional high-voltage circuits. The problem of "center-tapping" rectifier circuits to produce half the normal voltage is also briefly discussed. Diagrams and graphs.

14148* A Linear Transducer for the Electrical Measurement of Displacement. M. J. Tucker. *Electronic Engineering*, v. 24, Sept. 1952, p. 420-422.

A simple displacement pick-up is described which works on principle of a transformer with variable coupling. Over a range of 1 cm. it is accurate to 0.005 cm. on a linear scale and gives sufficient output to work a pen recorder without amplification. Photographs and diagrams.

14149* A Timing Circuit for Controlling Related High Energy Pulses. K. S. W. Champion. *Electronic Engineering*, v. 24, Sept. 1952, p. 423-425.

Describes an electronic timing circuit devised to control operation of a group of heavier pulse circuits. It should have wide application in problems where precise control of sequence of operation of several high-energy pulse circuits is required. Circuit diagrams.

14150 Fabricating Circuit on Plastic Breadboards. John H. Bigbee. *Electronics*, v. 25, Sept. 1952, p. 126-127.

¼-in. thermoplastic sheet supports components during circuit development. Wire leads, lugs, or hardware can be imbedded in the plastic using a hot soldering iron and slight pressure. Method is quicker and more convenient than conventional breadboard layouts.

14151 Mean Square Vacuum-Tube Voltmeter. Louis A. Rosenthal and George M. Badoyannis. *Electronics*, v. 25, Sept. 1952, p. 128-131.

Describes a voltmeter which, by using nonlinear elements, instantaneously squares any input signal. Meter reading is linear in volts squared and, by recalibration, the square root of the

mean square can be read directly. Diagrams, photographs, and graphs.

14152 Simplified I-F Amplifier Design. Essad Tahan. *Electronics*, v. 25, Sept. 1952, p. 147-149.

Three-step method makes use of special charts that enable designer to choose circuit constants rapidly and to compare various combinations of parameters for obtaining optimum design. Typical examples.

14153 Chart Speeds Design of Feedback Amplifiers. Norris C. Hekimian. *Electronics*, v. 25, Sept. 1952, p. 153-155.

Feedback ratio is found from values of normalized gain, both with and without feedback, for change in an amplifier parameter. Method is used to check conventional feedback ratio measurements and to design amplifiers with desired gain-stability characteristics.

14154 Series-Resonant High-Voltage Supply. Peter G. Sulzer. *Electronics*, v. 25, Sept. 1952, p. 156-157.

By use of a series-resonant voltage step-up, conventional r.f. chokes may be used instead of a special oscillator coil. This type of supply eliminates bulky components usually required in circuits operating directly from the power frequency.

14155 Nomograph Aids Filter Designers. John L. Glaser. *Electronics*, v. 25, Sept. 1952, p. 158, 160.

Percent ripple at output can be determined for power-supply filters, including choke and capacitor input L. C. filters and R. C. types. Nomograph applies equally to full-wave and half-wave power supplies.

14156 Low-Cost Vertical-Seam Transformer. Seymour Cuker. *Electronics*, v. 25, Sept. 1952, p. 168, 172, 176, 180, 184, 188.

Describes operation and design of above. The r.f. type blocking-oscillator transformer described affords all advantages of the iron-core blocking-oscillator transformer, as well as additional advantages.

14157 A Circuit for the Limitation of Discharge in G-M Counters. W. C. Porter and W. E. Ramsey. *Journal of the Franklin Institute*, v. 254, Aug. 1952, p. 153-163.

A simple 2-tube feedback arrangement to limit discharge in a counter to a small segment of its length, subsequently restoring all but a small portion of the tube to full sensitivity in about a microsecond, has been achieved. The procedure results in a marked reduction in dead-time, and a correspondingly large increase in life. Counting rate data are given along with studies of discharge distribution with and without the cut-off procedure. Alteration in the dead-time picture is illustrated by oscillograms.

14158 Germanium Transistors. John S. Saby. *General Electric Review*, v. 55, Sept. 1952, p. 21-24, 60.

Discusses the amplification properties and small power requirements of transistors, which make them suitable for use in many electronic devices.

14159 The Application of Transductors as Relays to Protective Gear. R. K. Edgley and F. L. Hamilton. *Proceedings of the Institute of Electrical Engineers*, v. 99, pt. 2, Aug. 1952, p. 297-309; disc., p. 309-313.

Describes some of many ways in which transductors may be used to give to simple relay elements some special characteristics required in protective-gear work. Circuit diagrams. 14 ref.

14160 High-Gain D.C. Amplifiers. K. Kandiah and D. E. Brown. *Proceedings of the Institute of Electrical Engineers*, v. 99, pt. 2, Aug. 1952, p. 314-326.

Surveys measuring instruments which use mainly thermionic-tube amplifiers, including those using various frequency-conversion methods. Fundamental measuring device in some of these instruments is a modification of basic electrical instruments. Numerous diagrams. 25 ref.

14161 The Design of a Practical D.C. Amplifier Based on the Second-Harmonic Type of Magnetic Modulator. S. W. Noble and P. J. Baxandall. *Proceedings of the Institute of Electrical Engineers*, v. 99, pt. 2, Aug. 1952, p. 327-344; dis., p. 344-348.

Describes some features involved in the design of d.c. amplifiers, with particular reference to an instrument designed and built at the Telecommunications Research Establishment. Results of tests and measurements carried out on the completed equipment are also given. Numerous diagrams.

14162 Transformer Overall Economic Efficiency. D. Zanobetti. *Proceedings of the Institute of Electrical Engineers*, v. 99, pt. 2, Aug. 1952, p. 367-370.

Reviews a method developed for comparing the economic performance of transformers of differing electrical characteristics and cost, over a predetermined number of years during which the load increases exponetially when the characteristics of the load and the energy costs are known.

14163* A Coaxial Power Triode for 50-KW Output up to 110 MC. R. H. Rhéaume. *Proceedings of the I.R.E.*, v. 40, Sept. 1952, p. 1033-1037.

Design requirements are reviewed for optimum electrode geometry, heat-dissipating ability, minimum lead inductance, high r.f. conductivity of the vacuum seals, and other desiderata for high-power, high frequency service. Mechanical features are described, and circuit performance of the tube is discussed for lower frequencies as well as the vhf. region. Diagrams and photographs.

14164* Inverted Magnetron. Joseph F. Hull. *Proceedings of the I.R.E.*, v. 40, Sept. 1952, p. 1038-1041.

A radically different type of magnetron is described in which the positions of the cathode and the anode segments are inverted from those in ordinary magnetrons. Electronic efficiencies of 50-80% were measured on these structures and static input impedances as low as 60 ohms were observed on high-power pulse tubes. Diagrams and graphs.

14165* Accuracy of Bolometric Power Measurements. Herbert J. Carlin. *Proceedings of the I.R.E.*, v. 40, Sept. 1952, p. 1042-1048.

Shows that Wollaston wire bolometers, when properly designed and mounted, can be used to measure cw. power over a frequency range extending into the millimeter wavelength region with an accuracy approaching that of low-frequency measurements. Diagrams and graphs.

14166* Multi-Element Directional Couplers. S. E. Miller and W. W. Mumford. *Proceedings of the I.R.E.*, v. 40, Sept. 1952, p. 1071-1078.

Tightly coupled directional couplers are analyzed in simple terms, and it is shown that any desired loss ratio, including complete power transfer between lines, may be achieved. The theories are verified using waveguide models operating at 4000, 24,000, and 48,000 mc., and it is indicated that the work is applicable to many types of electrical and acoustic transmission lines. Photographs and graphs.

14167* Notes on Methods of Transmitting the Circular Electric Wave Around Bends. S. E. Miller. *Proceedings of the I.R.E.*, v. 40, Sept. 1952, p. 1104-1113.

Discusses 3 ways to prevent energy from being converted out of the circular electric wave in bent round pipe. These are by removing the degeneracy between TE_{01} and TM_{11}, by converting to a normal mode of the bent guide at both ends of the bend, and by utilizing dissipation in unwanted modes to prevent power transfer to them. Diagrams and graphs.

14168 Some Limitations on the Maximum Frequency of Coherent Oscillations. Robert S. Elliott. *Journal of Applied Physics*, v. 23, Aug. 1952, p. 812-818.

Defines the limitations of oscillators as fundamental rather than technological. Divides oscillators into 2 groups. Group I contains all coherent oscillators which require a resonant structure to extract energy from an electron beam, the useful output being obtained by coupling to the field of the resonant structure. Group II contains all oscillators which do not fit the description of Group I. 14 ref.

14169 A Mathematical Analysis of a Dielectric Amplifier. Louis A. Pipes. *Journal of Applied Physics*, v. 23, Aug. 1952, p. 818-824.

Mathematical analysis of the fundamental circuit on which the operation of dielectric amplifiers depends. Analysis is based on the assumption that the effective hysteresis curve of the amplifier's dielectric material may be represented by a hyperbolic sine

33. *Electricity and Electronics*

function. The case of resistive load is analyzed and expressions for steady-state input and output currents are calculated. 14 ref.

14170 The Decay and Recovery of the Pulsed Emission of Oxide-Coated Cathodes. R. M. Matheson and L. S. Nergaard. *Journal of Applied Physics*, v. 23, Aug. 1952, p. 869-875.

Cathodes consisting of BaO on Ni were studied, using diodes of cylindrical geometry having water-cooled Cu anodes spaced 0.019 in. from the cathode. Graphs.

14171 Space Charge Reduction of Low Frequency Fluctuations in Thermionic Emitters. T. B. Tomlinson. *Journal of Applied Physics*, v. 23, Aug. 1952, p. 894-899.

Brief review of methods of measuring the space-charge reduction factor for shot noise. Attention is drawn to the difficulties on making a similar measurement for flicker noise. An indirect qualitative test is described in which a triode is used both in normal manner and as a diode under retarding field conditions. 17 ref.

14172 Permanent Magnets Increase Capacity and Life of Switch Contacts. R. B. Immel. *Machine Design*, v. 24, Sept. 1952, p. 132-138.

Discusses the addition of permanent magnets to the contacts of d.c. switches which provides an effective arc blowout field and greatly increases their interrupting capacity. This eliminates necessity for additional contactors and relays normally required to handle the circuits of standard manual master switches. Data for various Alnico compositions are charted.

14173* A New High Voltage Laboratory. *Machinery Lloyd* (Overseas Ed.), v. 24, Aug. 30, 1952, p. 99-101.

Describes new high-voltage test laboratory of the Brush Electrical Engineering Co., Ltd., Leicestershire, England.

14174 A General Network Theorem, With Applications. B. D. H. Tellegen. *Philips Research Reports*, v. 7, Aug. 1952, p. 259-269.

14175 Area Contacts on Germanium. J. W. Granville and H. K. Henisch. *Proceedings of the Physical Society*, v. 65, sec. B, Aug. 1, 1952, p. 650-651.

Observations of Au contacts applied by evaporation in a vacuum to n-type germanium of 5 ohm-cm. resistivity and a Hall coefficient of about 10^4 cm.^{3}/coulomb. Graphs.

14176 Contact Properties of p-Type Germanium. J. W. Granville, H. K. Henisch, and P. M. Tipple. *Proceedings of the Physical Society*, v. 65, sec. B, Aug. 1, 1952, p. 651-652.

Results of experimental study of the above are charted and briefly discussed.

14177 13 Ways to Use Magnetic Amplifiers. H. D. James. *Product Engineering*, v. 23, Sept. 1952, p. 144-148.

Outline discussion of above with circuit diagrams.

14178* Measuring the Insulation Resistance of Three-Phase Circuits With Insulated Ground. (Russian.) A. S. Legler. *Promyshlennaia Energetika*, v. 9, Jan. 1952, p. 11-14.

Describes equipment and mathematical formulas for the above.

14179 A Precision Megohm Ratio Unit for High Voltage Measurements. John N. Harris. *Review of Scientific Instruments*, v. 23, Aug. 1952, p. 409-413.

Describes above consisting of 100 resistance units wound of manganin wire. Also reviews a general method for setting up accurate resistance ratios by comparing 2 groups of resistors in appropriate series and parallel arrangements. Graphs and photographs.

14180 The 6BN6 Gated-Beam Tube as a Fast Coincidence Circuit. Joachim Fischer and John Marshall. *Review of Scientific Instruments*, v. 23, Aug. 1952, p. 417-420.

Performance of the 6BN6 gated-beam tube as a fast coincidence circuit for short positive pulses was investigated experimentally. Design considerations are described and curves of performance are shown. This tube has been applied to coincidence measurement of pulses from photomultipliers.

14181 Microwave Pulse Power Measurement Techniques. W. H. Dobbertin. *Tele-Tech*, v. 11, Sept. 1952, p. 54-55, 162-164.

"Notch" methods developed to measure levels down to the microwatt range where C.W. techniques prove unsatisfactory. Two equipment designs are discussed, one for production use and one for field or laboratory.

14182 Subminiature Selenium Diodes in Electronic Equipment. J. T. Cataldo. *Tele-Tech*, v. 11, Sept. 1952, p. 70-71.

Presents specifications and suggested uses of the above. Graphs and photographs.

14183 Visual Display Methods for Microwave Measurement. F. J. Burkhard. *Tele-Tech*, v. 11, Sept. 1952, p. 76-78.

Presents a technique which replaces time-consuming point-by-point measurements in production tests of waveguide devices. Diagrams.

14184 Effect of Filament Voltage on Vacuum Tube Characteristics. Arthur J. Winter. *Tele-Tech*, v. 11, Sept. 1952, p. 82-83, 150, 152, 154.

14185 Stability Characteristics of Standard Composition Resistors. C. K. Hooper. *Tele-Tech*, v. 11, Sept. 1952, p. 88-89, 144, 146, 148.

Study of the above for resistors of various sizes and ratings; covering various conditions of ambient temperature, load and time, both within and beyond the limits of specification JAN-R-11. Graphs.

14186* Techniques of Sealing by Optical Polishing. (French.) Jacques Bleuze and Pierre Dussaussoy. *Vide*, v. 7, May 1952, p. 1182-1190.

Discusses the above process used in sealing electronic tubes, outlining its advantages over ordinary sealing processes. Various examples of application are described. Photographs and schematic drawings.

14187* Study of Gas-Filling Tubes for Industrial Application. (French.) C. Biguenet and M. Vassilian. *Vide*, v. 7, May 1952, p. 1191-1196.

Discusses use of xenon as a filling gas for tetrodes.

14188 Negative-Feedback Amplifiers; Overloading Under Pulse Conditions. J. E. Flood. *Wireless Engineer*, v. 29, Aug. 1952, p. 203-212.

Investigation of overloading of simple resistance-coupled negative-feedback amplifiers for an input signal which rises from zero to its final value at a uniform rate. Results are given for 1-stage, 2-stage, and 3-stage amplifiers. Equations and diagrams.

14189 Spectrum of a Frequency-Modulated Wave. W. C. Vaughan. *Wireless Engineer*, v. 29, Aug. 1952, p. 217-223.

Shows how Bessel coefficients enter into the analysis of frequency modulated wave. Serves as introduction to the use of Bessel functions in radio engineering. Tables and graphs.

14190* Treatment of Multiconductor Systems With Transverse Electromagnetic Waves at High Frequency. (German.) Hans J. von Baeyer and Ronald Knechtli. *Zeitschrift für angewandte Mathematik und Physik*, v. 3, July 15, 1952, p. 271-286.

Deals with problems of wave-propagation on multiconductor transmission lines at very high frequencies. Transmission line equations for current and voltage on each conductor are given in a generalized form using matrix symbols. Two examples show how these equations may be applied to practical problems and how proper boundary conditions are introduced. The first concerns the theory of a transmission-line directional coupler, the second a simplified theory of the folded dipole antenna.

14191* Effect of Contraction on the Temperature and Field-Strength Pattern in Front of the Cathode. (German.) G. Ecker. *Zeitschrift für Physik*, v. 132, no. 3, 1952, p. 248-260.

Shows mathematically that contraction of the cathode (electric-arc) increases temperatures, concentration of light emission, and average field strength. Data are charted. 11 ref.

Miscellaneous Publications

14192 Quarterly Progress Report. Research Laboratory of Electronics, Massachusetts Institute of Technology, July 15, 1952, 95 pages. (TK161 M38q)

Summarizes work on electron-emission problems, physical electronics of the solid state, microwave gaseous discharges, solid-state physics, low-temperature physics, microwave spectroscopy, molecular beam research, magnet laboratory research, tube research and development communication research, and analog-computer research.

Books

14193* Lincoln's Industrial-Commercial Electrical Reference. Ed. 2. E. S. Lincoln. 1500+ pages. 1952. Electrical Modernization Bureau, Inc., New York. (TK145 N63i2)

Second edition has been published after a thorough study of several thousand questionnaires filled in by owners of the first edition (latter appeared in 1941). Much technical data has been added and many improvements made, including an index at the beginning of each section.

14194 Electronic Measurements. Ed. 2. Frederick Emmons Terman and Joseph Mayo Pettit. 707 pages. 1952. McGraw-Hill, New York. (TK7835 T27e2)

Succeeds "Measurements in Radio Engineering" (1935) as a college text, and as a reference book for the practicing engineer. The new book covers measurement fundamentals in numerous fields beyond conventional radio, including television, radar, and other pulsed systems; microwaves; and a diversity of techniques of value to engineers in other areas who may use electronics in their instrumentation. Diagrams, graphs, tables, and footnote references.

See also:
13253 (magnetic alloy tapes)
13520 (switch for electronic recorders)
13564 (electronic analog for computers—book)
13652 (pulse generator for gas engine)
13660 (ignition electric locomotive)
13687 (high-titania dielectric ceramics)
14093 (induction of currents by sudden creation of magnetic poles)

34. GRAPHIC ARTS

14195 Development of the NPIRI Planetary Rubometer. William C. Walker. *American Paper Converter*, v. 26, Sept. 1952, p. 11-13.

Lack of a suitable standard for measurement of rub resistance has resulted in confusion for converting and printing industries. Details of the Planetary Rubometer, designed to meet that need, are presented.

14196* Gravure Printing on Plastic Film. *Canadian Printer and Publisher*, v. 61, Aug. 1952, p. 29, 43.

Tells how up to 4 colored designs are printed on materials including vinyl, polyethylene and cellophane. Photographs.

14197* Kinetics of Chemical "Ripening" of Photographic Emulsions and Role of Sulfur Compounds. (Russian.) K. V. Chibisov, A. A. Titov, and A. A. Mikhailova. *Doklady Akademii Nauk SSSR*, new ser., v. 84, May 21, 1952, p. 547-550.

Data charted, tabulated, and discussed.

14198* Relationship Between Maximum Light Sensitivity of Photographic Emulsions Corresponding to Their Fog Density and to Accumulation of Nonhalide Silver During Primary Aging. (Russian.) I. M. Ratner. *Doklady Akademii Nauk SSSR*, new ser., v. 84, June 1, 1952, p. 753-755.

A study was made of the above relationships. Data are charted and discussed.

14199* An Experimental Document Copying Method. Paul A. Barbee. *International Blue Printer*, v. 25, Aug. 1952, p. 18-20.

Describes equipment and procedure known as Verifax which combines Verichrome photography and facsimile. The Verifax Printer Type I is an office machine for producing copies of typed, written or printed originals rapidly and easily. The method employed utilizes transfer of the image from a matrix paper to a print paper. No drying is necessary; copies can be handled or filed immediately. The equipment is not yet commercially available.

14200* Ink Drying. *International Bulletin*, July 1952, p. 14-25; disc., p. 25-27.

Includes "General Introduction" by W. H. Banks, "Some Studies on the Penetration of Viscous Oils into Porous Paper" by G. E. Carlsson and L. Pehl, and "Experimental Observations on the Penetration of Oil from Ink into Paper" by A. H. Smith and R. R. Coupe. Tables and graphs.

14201* Methods of Measuring the Drying of Inks on Paper. *International Bulletin*, July 1952, p. 28-29; disc., p. 30.

Includes "A New Ink Drying Time Recorder" by L. Pihl, "The Patra 'Set-Off' Drying Time Apparatus" by R. R. Coupe and G. H. Essex, and "The I. G. T. Drying Time Recorder" by J. H. Monroy. Photographs.

14202* Chemical Aspects of Ink Drying. *International Bulletin*, July 1952, p. 31-43; disc., p. 44-45.

Includes "Some Investigations on the Drying of Lithographic Inks", by G. E. Carlsson and L. Pihl, "The Inhibition of Drying of Lithographic Varnishes by Acid and Salt Solutions", by R. R. Coupe, "Adsorption of Cobalt Naphthenate by Cellulose Fibers", by R. R. Coupe, and "Erratic Drying of Offset Inks", by D. Tallenaar. Tables and graphs.

14203* The Pressure Distribution in Letterpress Printing at the Moment of Impression. G. E. Carlsson and L. Pihl. *International Bulletin*, July 1952, p. 46-49; disc., p. 49.

Briefly describes experimental procedure and lists results of above. Photographs and diagrams.

14204* Studies in Letterpress Printing. R. G. W. Croney. *International Bulletin*, July 1952, p. 50-52; disc., p. 53-54.

Presents possible solutions to problem of make-ready.

14205* The Behaviour of Rubber and Flexible Thermoplastic Printing Plates. R. G. W. Croney. *International Bulletin*, July 1952, p. 54-56; disc., p. 57.

A study of the behavior of rubber under stress in order to discover which physical principles are involved, and to develop materials which exhibit lateral spread.

14206* The Use of Limit Gauges in the Pre-Make-Ready. J. F. Monroy. *International Bulletin*, July 1952, p. 57-60.

Points out advantages of using gages and briefly introduces a new instrument for measuring sliding friction between cylinder packing and type material. Diagram and photograph.

14207* Determination of the Ruling Distance for Half-Tone Blocks. J. F. Monroy. *International Bulletin*, July 1952, p. 60-62; disc., p. 62-63.

Shows that it is possible by means of a simplified printability test to determine the ruling distance for a given grade of paper with a very satisfactory degree of certainty. Illustrated.

14208* Cronak Plate Surface Treatment is Simplified. *Modern Lithography*, v. 20, Sept. 1952, p. 43-44.

Gives instructions for the above treatment.

14209 The Manufacture of Stencils and Duplicating Inks. A. H. Woodhead. *Paint Manufacture*, v. 22, Aug. 1952, p. 283-286, 313.

Gives details of procedures and of compositions of materials used. Graphs.

14210* The Technical Background of the Collotype Process. P. C. Smethurst. *Photographic Journal*, v. 92B, July-Aug. 1952, p. 115-123.

Mechanism of image formation in the colotype process is outlined in terms of the physical behavior of the gelatin matrix. Factors requiring control in practical operation of the process are described.

14211* Chemical Sensitization of a Silver-Bromide Sol by Adjustment of the Silver Ion Concentration. E. E. Loening. *Photographic Journal*, v. 92B, July-Aug. 1952, p. 126-127.

Photographic effects of conversion of the bromide body into a silver body are described. Graphs.

34. *Graphic Arts*

14212* New Printing Process Aids The Blind. *Plastics*, Aug. 1952, p. 224-225.

Describes prototype machine which will, when fully developed, increase the amount of reading matter available to the blind and reduce its cost and bulk. Thinner paper and printing in a plastics "ink" which produces solid dome-shaped dots of regular size and uniform in relief are used.

14213* Commercial Photography: Rubber Latex in Photography. George L. Wakefield. *Process Engravers' Monthly*, v. 58, July 1951, p. 206, 208.

Surveys the above.

14214* Aza-Indolizines as Photochemically Interesting Substances. (German.) E. J. Birr. *Zeitschrift für Wissenschaftliche Photographie, Photophysik und Photochemie*, v. 47, nos. 1-3, 1952, p. 2-27.

Surveys the chemistry of above and shows that members of this class of chemicals have various highly useful functions in photography. 28 ref.

14215* Theory of the Sabattier Effect. (German.) W. Braun. *Zeitschrift für Wissenschaftliche Photographie, Photophysik und Photochemie*, v. 47, nos. 1-3, 1952, p. 27-39.

The above is defined as a photographic reversal effect. Arens theory of this effect; dependence of the Sabattier effect on photographic emulsion properties, experimental results, and relationship between Sabattier and Herschel effect are discussed. Tables and graphs.

14216* Contribution to the Nephelometry of Silver Chloride-Gelatin Emulsions. (German.) Franz Evva. *Zeitschrift für Wissenschaftliche Photographie, Photophysik und Photochemie*, v. 47, nos. 1-3, 1952, p. 39-58.

Details of theoretical and experimental investigation. Graphs and tables. 27 ref.

See also:
13482 (x-ray film study)

35. STATISTICS AND ECONOMICS

14217* Coal in Canada, 1951. Industrial Requirements and Supply. C. L. O'Brian. *Canadian Mining and Metallurgical Bulletin*, v. 45, Aug. 1952, p. 460-469; *Transactions of the Canadian Institute of Mining and Metallurgy*, v. 55, 1952, p. 282-291.

Detailed presentation of industrial outlets for coal in Canada. 25 tables.

14218 Forecasting in the Chemical Industry. Raymond H. Ewell and Beth Scheuerman. *Chemical and Engineering News*, v. 30, Aug. 25, 1952, p. 3517-3522.

Discusses need for a more objective method of forecasting to put the future planning of the chemical and chemical process industries on the soundest possible basis. Illustrated by a series of graphs.

14219 The European Chemical Industry: The Netherlands. *Chemical and Engineering News*, v. 30, Sept. 8, 1952, p. 3698-3705.

Describes increased industrialization of the Netherlands with emphasis on chemical advancements. Graphs, photographs and tables.

14220 Pesticide Requirements for 1953 Predicted. Harold H. Shepard. *Chemical and Engineering News*, v. 30, Sept. 15, 1952, p. 3824, 3826.

Estimates future amounts of the above which will be used and includes specific reference to DDT, benzene hexachloride, newer chlorinated organics, parathion, lead arsenate, calcium arsenate, pyrethrum flowers, rotenone-bearing roots, ground sulfur, copper sulfate, dithiocarbamates, 2,4-D, and 2,4,5-T.

14221 Efficiency Doesn't Always Pay. Olaf Schwartzkopff. *Chemical Engineering*, v. 59, Aug. 1952, p. 140-141.

Shows that realistic efficiency cannot be calculated for some process-engineering operations. Two examples of negative efficiency are discussed. Considers efficiency vs. rates, inclusion of economic factors, and how to determine optimum economic design.

14222 New Data on Fertilizer Phosphates. *Chemical Engineering*, v. 59, Aug. 1952, p. 142-145.

Tabular data on sources, production, consumption, plant capacity, and manufacturers.

14223* The Oil Industry Looks Ahead. Vernon Smith. *Institute of Petroleum Review*, v. 6, Aug. 1952, p. 287-293.

An economic analysis. Liberally illustrated by means of graphs.

14224 The American Society for Testing Materials Looks at the Metal Tin. Bruce W. Gonser. *Metal Progress*, v. 62, Sept. 1952, p. 72-75.

Discusses economic status and future prospects for tin. Considers resources and methods of recovery of the metal, use as a coating in the container industry, as a solder in automobile-body construction, and methods of analysis for impurities.

14225* A Report to the White House. 3. Petrochemical End Products. *Oil and Gas Journal*, v. 51, Sept. 15, 1952, p. 98, 100-102. (From "A Report to the President of the United States by the President's Materials Policy Commission, June 1952".)

Above are surveyed as to future production with particular emphasis on plastics, plasticizers, solvents, synthetic rubber and fibers, and raw material requirements. Tabulated information.

14226* A Survey of the Antimony Situation. E. F. Jeal. *South African Mining and Engineering Journal*, v. 63, Aug. 2, 1952, p. 951, 953.

Presents statistical report including uses and availability of South African Sb, production and sales, market factors, and information concerning Consolidated Murchison, the leading South African producer. Tables.

14227* United States Requirements of Wood Pulp for Papermaking. James L. Ritchie. *Tappi*, v. 35, Aug. 1952, p. 10A, 12A, 14A, 16A.

Survey of past needs, present utilization, and future outlook of above. Tables.

14228* Cobalt: World Sources and Supplies. J. B. Richardson. *Times Review of Industry*, v. 6, July 1952, p. 24-25, 27.

Surveys the above. Includes description of methods of recovery from the ore, and of smelting and refining.

Miscellaneous Publications

14229 Industrial Minerals of the Pacific Northwest. A. J. Kauffman, Jr. U. S. Bureau of Mines, Information Circular 7641, Aug. 1952, 75 pages. (TN21 Un3i)

Presents detailed information for the states of Oregon, Washington, Idaho, and Montana. 14-page bibliography.

Books

14230 Selling the United States Market; A Marketing Guidebook for Manufacturers and Distributors. Gustav E. Larson and Marshall N. Poteat. 135 pages. 1951. U. S. Dept. of Commerce, Washington. (Domestic Commerce Series 29.) (For sale by U. S. Govt. Printing Office, Washington.) (HF5415 L32s)

Part 1 presents statistical data on markets; Part 2 describes distribution channels, facilities, and services.

14231 Directory for the British Glass Industry. Ed. 5. D. W. Rollin and E. Rollin, compilers. 414 pages. 1951. Society of Glass Technology, Sheffield, England. (Directory Shelf)

See also:
13016 (cost analysis for domestic Mn recovery)
13627 (fuel and energy resources—UN conference)
13665 (economics of LP-gas for motor fuel)
13770 (economics of industrial utilization of agricultural wastes)
13796 (industrial alcohol statistics)
14264 (free enterprise way of life—book)

36. MISCELLANEOUS

14232 Isothioureas as Germicides. F. J. Bandelin and J. V. Tuschhoff. *Journal of the American Chemical Society*, v. 74, Sept. 5, 1952, p. 4271-4273.

A series of homologous S-alkyl isothioureas and their 1,3-dialkyl derivatives were prepared and investigated for germicidal activity. Extensive table showing effect of various alkyl substitutes on the antibacterial activity of substituted isothiourea alkyl ethers.

14233* New High-Temperature Alloys. A. R. Edwards. *Australasian Engineer*, June 7, 1952, p. 42-47.

Surveys the above with emphasis on present and possible future developments in addition of Cr, Mo, and W to Fe-, Ni-, or Co-base alloys. Considers fundamental metallurgical factors involved. 29 ref.

14234* Chemical and Metallurgical Problems Arising in the Development of Processes for the Release of Atomic Energy. J. P. Baxter. *Australasian Engineer*, July 7, 1952, p. 49-52.

Problems include supply and concentration of U, its extraction in high degree of purity, health hazards, and storage and disposal problems.

14235* A Comparison of the Dielectric Behaviour of Pure Water and Human Blood at Microwave Frequencies. H. F. Cook. *British Journal of Applied Physics*, v. 3, Aug. 1952, p. 249-255.

Methods used to measure the complex dielectric constant of water and blood are described. Results obtained for water at temperatures between 0 and 60°C. are given and analyzed with relation to the Debye and the Cole-Cole dispersion equations. Possibility that the dispersion in water is characterized by a narrow spectrum of relaxation times is briefly discussed. Tables. 41 ref.

14236* Proteolytic Enzymes in Medicine. Milton A. Lesser. *Drug and Cosmetic Industry*, v. 71, Aug. 1952, p. 178-179, 250-255.

A review. 57 ref.

14237 The Building of the Fairless Works. *Fortune*, v. 65, Sept. 1952, p. 90-94.

Picture story showing construction of U. S. Steel's Fairless Works, on the Delaware River near Morrisville, Pa. The furnaces and mills comprise an integrated operation from ore dock to finished sheet, tinplate, bar, and pipe.

14238 Titanium Carbide: a New Heat-Resistant Light-Weight Material. Benjamin L. Hummel. *Machine Design*, v. 24, Sept. 1952, p. 139-144.

General discussion of properties, processes, applications, and future developments of above.

14239* Recent British Achievements in Medicinal Chemicals. F. Bergel. *Manufacturing Chemist and Manufacturing Perfumer*, v. 23, Aug. 1952, p. 326-329.

Among the above discussed are organic phosphates, neuromuscular and ganglionic blocking agents, and phosphorus anticholinesterases. 40 ref.

14240 Aluminum Alloys of High Modulus. *Metal Progress*, v. 62, Sept. 1952, p. 142, 144. (Condensed from "Development of Aluminum Alloys Having a High Young's Modulus", G. Meikle, J. Thompson, and M. E. Whilans, *Royal Aircraft Establishment*, Technical Note Met-149, Aug. 1951.)

14241* Cadmium. J. Lomas. *Mine & Quarry Engineering*, v. 18, Sept. 1952, p. 291-293.

Discusses origin, properties, and practical applications of above.

14242 The Rare Earths and Their Future. Clyde Williams. *Monthly Business Review* (Federal Reserve Bank of Cleveland), v. 34, Sept. 1952, p. 11.

Discusses the 14 metals in the "rare-earth" group of the periodic table—their separation, processing, and present and potential applications.

14243 Copper-Clad Aluminum. *Metal Industry*, v. 81, Aug. 29, 1952, p. 163-165.

Mechanical and physical properties tabulated. Information on soldering; welding; forming; annealing; and applications, especially electrical. Photographs.

14244 The Metallurgy of Zirconium: Its Extraction, Fabrication, and Properties. A. D. Merrian. *Metal Treatment and Drop Forging*, v. 19, Aug. 1952, p. 365-371.

Methods of extraction and properties of Zr are given with some present uses and future potentialities which are limited by high cost and difficulty of extraction. (To be continued.)

14245* Columbium—Rarest Jet Metal. Frank H. Cothay. *Mining World*, v. 14, Sept. 1952, p. 44-47.

A survey of the above in reference to Nigerian deposits, electrostatic and air separation, concentrate specifications, strength at high temperatures, and importance in high alloys. Photographs.

14246* The Technology of Titanium. R. I. Jaffee and J. M. Blocher, Jr. *Modern Metals*, v. 8, Aug. 1952, p. 62, 64, 66, 68. (Condensed from article in v. 4, "Resources for Freedom", report by the President's Materials Policy Commission.)

Discusses above including such topics as: problem of extraction; 2 leading economic processes (Kroll and iodide process); fabrication problem; special attributes of Ti; high-temperature Ti alloys; military applications; substitution and competitive factors.

14257* Water. *Power*, v. 96, Sept. 1952, p. 71-118.

Presentation of water fundamentals helpful to engineers and non-engineers who are leaders in industry, government, and community life. 3 parts include: "The World of Water", a nature story of water, land, wind, and weather; "Water Shortages in a Land of Plenty", why they occur and what is being done about them; and "A Water Program for Your Plant", sources, purification, and conservation of water.

14248* A Test for Bactericidal Activity in Which Bacteria Are Replaced by Wool. P. Larose and R. Fischer. *Research*, v. 5, Sept. 1952, p. 419-423.

Shows that relationships between bactericidal action and affinity for wool are not accidental and that they can serve as a basis of a new method for determining the bactericidal activity of a compound by the use of comparative affinity charts. Micrographs and graphs. 27 ref.

14249 South Korean Industrial Scrapbook. *Steel*, v. 131, Aug. 25, 1952, p. 74-75.

Briefly describes and illustrates some of the equipment and procedures of Korean metalworking plants, many of which are quite antiquated.

14250* Technical Magnesium Alloys and Aluminum Alloys Containing Magnesium. (German.) Gustav Siebel. *Zeitschrift für Metallkunde*, v. 43, July 1952, p. 238-244.

Comprehensive report on research and development work done at I. G. Farbenindustrie, A.G., Bitterfeld, Germany. 132 ref.

Miscellaneous Publications

14251 PAR Research. T. L. Robev. *American Gas Association, Proceedings*, v. 33, 1951, p. 542-552. (TP700 Am35p)

Discussion of above research program sponsored by American Gas Assn., with a listing of all current projects giving the location and objectives of each.

14252 Evaluating the Performance of Research Personnel. A Manual for Supervisors. American Institute for Research, Pittsburgh, Aug. 1951, 50 pages. (Photostat) (T21 Un3r)

Introductory discussion followed by consideration of 36 groups of behavior—giving for each: definition, examples of effective and ineffective behaviors, and illustrations of them.

14253 The Engineering Properties and Applications of Spheroidal Graphite Cast Iron. A. B. Everest. 4th International Mechanical Congress, June 1952, 23 pages.

Summarizes latest information on these new irons in engineering practice. Includes tables and text on mechanical and physical properties; production characteristics including mention of machinability and weldability; modifications, including alloyed

33. *Miscellaneous*

structures and surface heat treatment; hot and cold working; service properties; and illustrated applications. 23 ref.

14254 Symposia on Materials and Design for Light-Weight Construction: The Magnesium Symposium. Engineer Research and Development Laboratories (Fort Belvoir, Va.), 1951, 64 pages. (Available from Office of Technical Services, U. S. Dept. of Commerce, Washington.) (T21 Un3r)

Consists of 6 papers on various aspects presented Feb. 9, 1951.

Books

14255 The Dynamics of Faulting and Dyke Formation With Applications to Britain. E. M. Anderson. 206 pages. 1951. Oliver and Boyd, London. (QE606 An23d2)

Deals with above types of fractures which occur in the earth's crust, caused by earthquakes and minor disturbances. These are of special importance in underground mining operations. Examples observed in Great Britain illustrate the discussion.

14256* The Petroleum Dictionary. Lalia Phipps Boone. 338 pages. 1952. University of Oklahoma Press, Norman. (TN865 B64p)

Origins, development, and characteristics of oil-field language are treated briefly. Dictionary proper contains about 6000 entries, technical and non-technical, concentrated chiefly on the 4 main branches of the industry: exploration (including prospecting and drilling); production; pipelining; and refining. Bibliography.

14257 Introduction to Geophysical Prospecting. Milton B. Dobrin. 435 pages. 1952. McGraw-Hill, New York. (TN269 D72i)

Based on mimeographed notes used for a 1st-year graduate course. Especially useful for the non-specialist. Emphasizes gravity, magnetic, and seismic techniques but covers all current methods including electrical, radioactivity, and well-logging. Chapters on case histories, radio position location, and current research. Photographs, diagrams, charts, and chapter references.

14258 The Art of Clear Thinking. Rudolf Flesch. 212 pages. 1951. Harper & Bros., New York. (BF455 F63a)

The author has assembled for the general reader today's scientific findings on thinking and problem-solving. Drawing from psychology, linguistics, anthropology, neurology, sociology, and half a dozen other fields of science, he has produced a modern "guide for the perplexed". Shortcuts for everyday mathematics, a speedy note-taking system, a quick self-test of executive ability, the difference between wit and humor, and strategy of Twenty Questions, and many other topics are discussed entertainingly.

14259 Elementary Metallurgy. Ed. 2. W. T. Frier. 258 pages. 1952. McGraw-Hill, New York.

Completely revised due to extensive progress in metallurgy in the 10 yrs. since appearance of 1st edition. Latter based on teaching notes for class in a technical night school. Includes list of helpful motion pictures.

14260 Air War and Emotional Stress; Psychological Studies of Bombing and Civilian Defense. Ed. 1. Irving L. Janis. 280 pages. 1951. McGraw-Hill, New York. (TL555 J25a)

Part I tells what is now known about the feelings, thoughts, and behavior of Japanese A-bomb survivors. A detailed picture is given of the psychological impact of the A-bomb disasters. Part II analyzes recurrent patterns of disaster behavior—specifying ways in which environmental conditions of wartime disasters influence emotional responses, attitudes, and overt actions. Adjustment mechanisms are discussed. Part III deals with psychological problems likely to arise in the U. S. as a result of the threat of atomic warfare. Numerous practical suggestions for Civilian Defense planning are presented.

14261 The Technique of Handling People. Donald A. Laird and Eleanor C. Laird. 139 pages. 1951. McGraw-Hill, New York. (HF5353 L14t)

A brief, readable book which shows, by means of concrete examples from the business world of today, how to get people to put forth their best efforts. Eleven "secrets of handling people" are each covered in such an interesting manner that it is difficult to lay the book down. In the final chapter, the key to the whole problem—leading not driving—is set forth.

14262 Gesteine und Minerallagerstätten. Zweiter Band. Exogene Gesteine und Minerallagerstätten. (Rocks and Mineral Deposits. Vol. II. Exogenous Rocks and Mineral Deposits.) Paul Niggli and Ernst Niggli. 557 pages. 1952. Verlag Birkhäuser, Basel, Switzerland. (QE363 N56a)

Deals with effects of weathering, formation and types of soil, types and characteristics of sediments, formation of snow and ice, and petrographic regions of sedimentary origin. Diagrams, tables, graphs, and numerous references.

14263 The Scientific Papers of James Clerk Maxwell. W. D. Niven, editor. 1488 pages. Dover Publications, New York. (QC19 M45s)

A new unabridged edition containing all the published papers, lectures, essays, and short treatises of the great theoretical physicist of the 19th Century.

14264 A Creed for Free Enterprise. Clarence B. Randall. 177 pages. 1952. Little, Brown and Co., Boston. (HD82 R15c)

Discussion from a businessman's viewpoint, by the president of Inland Steel Co. Presents experiences and his faith in the free enterprise way of life.

14265 Viruses as Causative Agents in Cancer. C. P. Rhoads, chairman. *Annals of the New York Academy of Sciences*, v. 54, July 10, 1952, p. 869-1232. (Q11 N49a)

Consists of Preface, Introduction, and 31 papers presented at conference held Nov. 16-17, 1951.

14266 Science and Humanism; Physics in Our Time. Erwin Schrödinger. 67 pages. 1951. Cambridge University Press, London, England. (QC6 Sch75sh)

A very short but profound book on fundamental philosophical problems posed by science.

14267 Clear Writing for Easy Reading. Ed. 1. Norman G. Shidle. 176 pages. 1951. McGraw-Hill, New York. (PE1408 Sh61c)

Describes and teaches application of a specific method for writing reports, letters, memoranda, articles, or any kind of writing which attempts to explain, sell, or influence its readers. Numerous examples are drawn from actual business, professional, and social experience. More than the usual attention is concentrated on the everyday tasks of writing: office memoranda, reports, minutes of meetings, and letters of all types. There are numerous examples of good and poor writing.

14268 Smithsonian Logarithmic Tables. Prepared by George Wellington Spenceley, Rheba Murray Spenceley, and Eugene Rhodes Epperson. 402 pages. 1952. Smithsonian Institution, Washington. (Miscellaneous Collections, vol. 118) (QA55 Sp33s)

Tables of natural logarithms (to base e) and of common logarithms (to base 10).

14269 Geography in the Making: The American Geographical Society) 1851-1951. John Kirtland Wright. 437 pages. 1952. American Geographical Society, New York. (G2 W93g)

A chronicle of the Society's institutional development which also sheds light on two larger themes: history of modern geography, and evolution and functioning of learned institutions. Bibliographical notes and a list of the Society's publications.

14270 Du Pont: The Autobiography of an American Enterprise. 137 pages. 1952. E. I. Du Pont De Nemours & Co., Wilmington, Del. (HD9663 D92d)

The story of E. I. Du Pont De Nemours & Co. Published in commemoration of the 150th anniversary of the founding of the company on July 19, 1802. Profusely illustrated in black-and-white and in color.

14271 Republic Enduro Stainless Steels. 485 pages. 1951. Republic Steel Corp., Cleveland. (TA479.S7 R29r)

Covers development, types, properties, fabrication, heat treat-

ment, microstructures, transformations, available forms, maintenance, applications, corrosion resistance, etc. Numerous tables, graphs, and illustrations.

14272 The Royal Dutch Petroleum Company (N. V. Koninklijke Nederlandsche Petroleum Maatschappij). 205 pages. 1950. The Hague, Netherlands. (HD9576 K83d)

Profusely illustrated description of history, exploration, production, processing, chemical industry, transport, scientific research, marketing, and personnel.

See also:
13569 (substitutes for strategic metals)
14041 (symposium on genes and mutations)